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THE GRAPERIES AND GRAPES
OF NICHOLAS BIDDLE'S ANDALUSIA:
A STUDY IN GREEK REVIVAL LANDSCAPE PURSUITS

Emily Tyson Cooperman

A THESIS

in

The Graduate Program in Historic Preservation

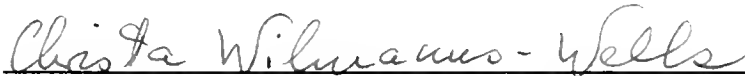
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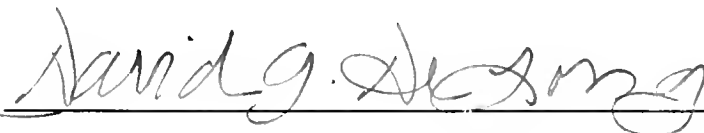
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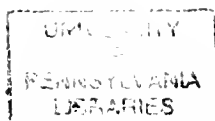
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PREFACE

Although altered from their original function and appearance, the subject of this study, the graperies at Andalusia, remain today one of the most prominent landscape features of the country seat of the Biddle family. Andalusia, located in Bucks County just north of the present Philadelphia limits, is best known for its other architecture, particularly the impressive Greek Revival mansion house or villa facing the Delaware River, a monument of this American architectural style. Andalusia is also a monument to Nicholas Biddle (1786-1844), a nationally important financier and one of the most influential men in Philadelphia in the early nineteenth century. But to limit our recognition of this man's importance to this simple description would be to lose the implications of his life as representative of a class of Americans. Because of his position as the head of the Bank of the United States, he was very much a political lightning rod. His "improvements" to and activities at the country seat to which he retreated from the city during his adult life, and ultimately retired at the close of his career, testify both to his personality and particular interests. But more than this, they record the taste and concerns of an elite and influential group of Americans at a formative moment in this nation's history, providing a link between the ideology of the Revolution to that of the era of Ralph Waldo Emerson and A. J. Downing. It was at Andalusia that Biddle made his most personal mark upon the

world, shaping a landscape which retains to the present many of the significant features he left there, recording his attitudes toward landscape and its accompanying associations with concepts of nature, commerce, and the identity of the emerging nation of the early nineteenth century.

Andalusia is best known as Nicholas Biddle's domain, but it had been since 1795¹ the country seat of the Craig family, into which Biddle married. John Craig, the principal owner before Biddle, had made considerable improvements to the main house from designs by Benjamin Henry Latrobe. As with most such places in the late eighteenth and early nineteenth century in the Philadelphia countryside, Andalusia was part of a working farm. This practice had its roots in the habits of the English landed gentry, and was solidly connected to the origins of the Pennsylvania colony. The founder's plan had been for a "system of great farms, with a central township divided into minor lots, ... proposed to extend all over the province."² Agriculture,

¹Nicholas B. Wainwright, *Andalusia, Countryseat of the Craig Family and of Nicholas Biddle and His Descendants* (Philadelphia: The Historical Society of Pennsylvania, 1976), 2. While this is an informal book without noted sources, research has shown that Wainwright, the President of the Historical Society of Pennsylvania (H.S.P.) as well as a Biddle descendant, worked closely from the Craig-Biddle Papers at H.S.P. and the Biddle Papers at Andalusia. Thus, while it does not follow the form of the most rigorous academic scholarship, the book has proved generally quite reliable when checked through my own research into the archival material.

²J. Thomas Scharf and Thompson Westcott, *History of Philadelphia, 1609-1884* 1 (Philadelphia: L.H. Everts & Co., 1884), 88.

and particularly the raising of grapes, would become an especially important feature of the estate under Biddle.

The graperies were built as very large forcing houses for raising European grape varieties, protecting them from severe cold and bringing them to early fruition. Their construction was part of a major building campaign at Andalusia begun in 1834 under the direction of Thomas Ustick Walter (1804-1887), best known as the architect of the U.S. Capitol during the middle of the nineteenth century.³ The 1830s changes at Andalusia included (beside the graperies) the addition of the Doric order temple front to the river side of the mansion, the best known feature of Andalusia, and the construction of the Gothic grotto by the Delaware River. A later campaign begun in 1838 further changed Andalusia under Biddle's direction, with the addition of the Gothic cottage, a large water tower at one end of the graperies, and a pump house near the river. Today, all that remains of the graperies are their massive masonry back walls. They now enclose a formal boxwood garden, as they have done for nearly a century. This study will explore the circumstances of the graperies' construction and their original configuration and consider the history of their functioning as greenhouses and the most important subsequent alterations to them. As a conclusion, the graperies' historic significance will be discussed, along with recommendations for

³Walter also worked directly with Biddle on the design and construction of Girard College in Philadelphia, a Greek Revival monument.

their preservation and interpretation.

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This thesis would not have been possible without the access graciously provided by James Biddle to the Biddle family records at Andalusia, in addition to his willingness to allow to me tramp through the estate's garden. Equally, this work would not have been completed without the assistance of both faculty and students of the Historic Preservation Program. Christa Wilmanns-Wells's insights and encouragement have been invaluable, as have been those of George E. Thomas, who has tirelessly served as a sounding board and proof-reader and urged me to keep working on the project. I would also like to acknowledge Tim Long's help and willingness to share the fruits of his own labor, as well as Andrew Goldfrank in the same respect. Finally, my advisor Ruth O'Brien deserves far more than my thanks for her long-standing patience and endless help, but I at least extend to her my enormous, heart-felt appreciation for all her dedication, support, and assistance. Without it this thesis may not have been completed.

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INTRODUCTION

Philadelphia Plant Traditions

By 1835, when Nicholas Biddle undertook the construction of his graperies, Philadelphia had already developed a rich history in agriculture and horticulture. As a center of both colonial and federal American culture, the city played an important part as a nexus of trends whose origins and influence ranged from the local to the international. Philadelphia was a center for both the discovery and cultivation of North American plant species and their export to Europe, particularly through John and William Bartram's collection and propagation work at their botanic garden in Kingsessing, beginning in the 1730s. By the end of the century, the city was also a point of introduction for Asian species into this country. For example, Andrew Hamilton of the Woodlands (like Bartram's, on the west bank of the Schuylkill) imported the first Gingko into this country.

The Bartrams were followed by several generations of Philadelphia nurserymen of national importance. These included Bernard M'Mahon, the author of the first American gardening book, *The American Gardener's Calendar* (1806), "for 50 years the book was the standard authority in America in the several fields of

gardening, its popularity being attested by 11 editions, the last in 1857."¹ Contemporary with M'Mahon was David Landreth, whose enterprise was "for many years the leading seed house in America and one of the great establishments of its kind in the world."²

Later in the nineteenth century, the Philadelphia tradition of plantsmen was continued by Thomas Meehan, the editor of *Gardener's Monthly* and later *Meehan's Monthly*, and Henry Dreer, founder of the Dreer seed house. This continuity would not have existed without a regional market for and interest in the products of these tradesmen. The Pennsylvania Horticultural Society was organized in 1827, although the American Philosophical Society was the first organization in Philadelphia "to discuss matters of prime interest to gardeners."³ Aspects of the Philadelphia horticultural tradition last to this day, for example in the pre-eminence of the Philadelphia Flower Show.

Agriculture was crucial to Philadelphia economy and culture from its inception, and integral to Penn's plan for the founding of the colony, as noted above. While late seventeenth century European culture had been essentially agrarian in

¹U.P. Hedrick, *The History of Horticulture in America to 1860* (1950; reprint, Portland, OR: Timber Press, 1988), 201.

²Hedrick, 204.

³Hedrick, 499.

nature and Pennsylvania was set up as a farming state, Philadelphia gentry remained highly interested in agricultural theory beyond the industrial revolution in the early nineteenth century. This trend followed the lead of such theorists as the Englishman Arthur Young, and not only resulted in the first organization for this interest in the country, the Philadelphia Society for Promoting Agriculture, founded in 1785, but caused this organization to thrive through the nineteenth century.

Early American Greenhouses and their Antecedents

Greenhouses in this country before 1840 were descendants of structures developed in sixteenth-century northern Europe. The rudiments of hothouse technology are known to have existed as early as Roman antiquity,⁴ and artificial shelter in the form of hot beds, cold frames, and lath houses had no doubt remained relatively common structures in agricultural use since then. The greenhouse was developed as a new building type to protect tender exotic species introduced into Europe, particularly northern Europe, during the Renaissance and after.⁵ Initially,

⁴Mica sheets were used as glazing on both houses and hot beds. See May Woods and Arete Swartz Warren, *Glasshouses, A History of Greenhouses, Orangeries and Conservatories* (New York: Rizzoli, 1988), 3.

⁵The interest in collecting and classification that began in the Renaissance is a complex and rich subject. By no means limited to plants these enterprises were in part based on Pliny's *Historia Naturalis*, and were driven by the forces of mercantilism. See Eva Schulz, "Notes on the History of Collecting and of Museums," *Journal of the*

the species mostly commonly cultivated in greenhouses were citrus brought from Asia.

As the interests of the quattrocento Italian Renaissance moved north, and trade expanded between European countries (particularly Holland) and Asian nations, importations of exotics increased. Like Chinese porcelain, oranges and lemons became items of luxury for the nobility and the very rich. The type of greenhouse referred to today as an orangery,⁶ was developed to meet the purpose of sheltering these plants. An orangery was often a feature of a formal garden. Very much houses for green things, these buildings were constructed with masonry walls, were conventionally roofed, and usually one story high. They were lighted by oversized but otherwise conventional window sash placed within the walls. The purpose of these structures was only to winter over tender plants, and not to provide a permanent environment for them. During much of the year citrus trees were placed in the garden, and were grown in containers in order to move them readily between greenhouse and garden. Early greenhouses were not generally used to start seedlings,

History of Collections 2, no. 2 (1990), 205-18. Schulz's article is particularly illuminating on Northern European trends in the sixteenth through eighteenth centuries.

⁶This term was not used for these early greenhouses until the nineteenth century. Prior to this, it connoted a garden or portion of a garden that featured orange trees (moved out from the greenhouse in the summer). Woods and Warren, 31. Because the term is commonly used and most widely understood for these early greenhouses today, I will follow present usage.

provide a year-round microclimate, or for forcing.

The large window sash, coupled with conventional southern exposure, allowed in enough low angle winter sunlight to keep the plants alive. The winter sun alone did not, however, provide sufficient heat, and an artificial source of warmth was necessary. In these early, orangery-type greenhouses heat from both solar and artificial sources was retained by the masonry mass of the building and by the warmed air within, just as it was in contemporary domestic architecture. The masonry of the graperies at Andalusia served the same, heat-retaining purpose. Not surprisingly, the first artificial heat for early orangeries was provided by wood-fueled fires in open hearths and, as early as the sixteenth century in England, in portable iron stoves.⁷

At the turn of the eighteenth century, advances in glass technology made changes in greenhouse form possible.⁸ As new plants that required greater heat and light were imported in larger quantities near the turn of the eighteenth century, lean-to shed glazing was developed, which allowed light through both the roof and the front wall (see figure 1).⁹ Deviating from the conventional manner of constructing sash with muntins between lights, sash with panes of glass lapped like

⁷Woods and Warren, 13.

⁸Stefan Koppelkamm, *Glasshouses and Wintergardens of the Nineteenth Century*, trans. Kathrine Talbot (New York: Rizzoli, 1981), 11.

⁹Woods and Warren, 29.

roof shingles set into wood frames with putty were developed.¹⁰ This type of glazing was more suited to the purpose of shedding water and was a logical adaptation to function. A sort of hybrid between window and roof technology, this type of sash obviated the need for wood cross muntins between lights that would deteriorate due to increased water exposure. This "hybrid" sash was nonetheless subject to decay, given the inherent vulnerability of the construction materials, and few old sash survive. Eventually, this sort of sash came to be used for both vertical and angled glazing in greenhouses, and persisted into the late nineteenth century. "Stoves," as the artificially heated, lean-to buildings came to be called in England, were a modification of the earlier orangery greenhouse types. The heated rear wall was retained,¹¹ but the other three were replaced by the new sash and its support.

Transformations in the open hearth and portable stove heating methods also came about in the late seventeenth and early eighteenth centuries. In order to provide a more even means of warming the air within the greenhouse than obtained through a single, internal stove or hearth, flues were constructed through the rear wall in a sort of switchback system, to pass heated air through and warm the whole of the masonry,

¹⁰Woods and Warren illustrate several examples of this kind of sash. See, for example, pp. 88-89, of the 1800 cast-iron greenhouse at Chiselhampton.

¹¹This was normally the north wall and faced south, as greenhouse builders early learned that this was the means to get winter sunlight into the house. This was also a lesson learned early in general in European domestic architecture, as many early houses (as well as Friends' Meeting Houses) built in Pennsylvania demonstrate.

creating, in effect, a single, large radiator. The furnace(s) were placed outside the building, normally at the north side in a small shed. This means of providing heat was to prevail in this country into the middle of the nineteenth century.

The first greenhouse in this country has been said to have been built by Andrew Faneuil in Massachusetts at the beginning of the eighteenth century.¹² Greenhouses were common features of the estates of wealthy colonists. This was no doubt due to the contemporary fashion in Europe, particularly England. One of the earlier examples, and a rare survivor, is the "orangery" at Wye House on the eastern shore of the Chesapeake Bay in Maryland.¹³ Both Washington and Jefferson, wealthy landowners, built greenhouses in the country. The large brick building in the gardens at Mount Vernon today is a reconstruction, but the original attached greenhouse at Monticello survives. Greenhouses existed throughout the colonies. This 1776 description of the view from the East River reveals that New York was no exception:

on both sides were many very elegant country seats ... several evacuated by the Tories. I visited the Garden of one Gentleman in which was a Summer House which the Gardener showed me ... many

¹²This is noted in several sources. See, for example, Hedrick, 50. He notes that the date of Faneuil's house was between 1709 and 1737.

¹³This greenhouse was extensively documented by H. Chandlee Forman, both for the Historic American Building Survey and in his own publications. See Forman, *Old Buildings, Gardens and Furniture in Tidewater Maryland* (Cambridge, MD: Tidewater Publishers, 1967), 70-75.

curious Flowers, & c.; but the greatest Rarity was Orange, Lime, Pomegranet, & Citron Trees all Bearing Fruit.¹⁴

Not surprisingly, due to the interest in plants in Philadelphia and the city's importance as a center of colonial culture, many greenhouses were built in the region. Greenhouses in Philadelphia country seats of the late eighteenth century have been called "requisite."¹⁵ There is evidence, for example, that an orangery existed at the Penn family's estate, Springettsbury, by 1754.¹⁶

Certain Philadelphia greenhouses from the period after the Revolution, and their accompanying botanic collections, were among the best known in the country. Most often visited and described were those at Lemon Hill, the country seat of Henry Pratt, and at the Woodlands, owned by William Hamilton. Hamilton was one of the most prodigious American importers of exotics, and his introductions include the *Ginkgo biloba*.¹⁷ Several graphic representations survive of the Lemon Hill greenhouses (see figure 2, at left), and show it to have been built of a central, large

¹⁴*New York City's Gracie Mansion: A History of the Mayor's House*. (New York: Gracie Mansion Conservatory, 1984), 11.

¹⁵Elizabeth McLean, "Town and Country Gardens in Eighteenth-Century Philadelphia," in *British and American Gardens in the Eighteenth Century* (Williamsburg, VA: The Colonial Williamsburg Foundation, 1984), 142.

¹⁶See McLean, 139. She cites a description of the garden there in which several species of citrus were included.

¹⁷Hamilton's efforts in this matter are well documented. See, for example, McLean, 143.

masonry volume of the orangery type flanked by attached, lean-to sections, a combination that had been prevalent in England for some time. The older, "orangery" form, nearly always ornamented in some manner, became the center of display for plants, ultimately acquiring the name "conservatory," while the flanking lean-to sections were generally more utilitarian. This sort of organization in greenhouses was to persist in this country well into the late nineteenth century, as the form of the well-known, enormous greenhouses at Lyndhurst on the Hudson River in New York demonstrate.

Although there is no known surviving representation of the greenhouses at the Woodlands, a later description identifies them as this type:

ascending ... the greenhouse appears in view, the front of which, including the hothouse on each side, measures one hundred and forty feet and contains nearly ten thousand plants.¹⁸

Another well known, although short-lived greenhouse of this configuration was completed by 1803¹⁹ at the Elgin Botanic Garden in New York, founded by David Hosack.

¹⁸Thompson Westcott, *The Historic Mansions and Buildings of Philadelphia* (Philadelphia: Walter H. Barr, 1895), 377. Westcott was quoting an 1830 description.

¹⁹Woods and Warren, 134. They include an engraved view of the greenhouses on this page.

Greenhouses in the Early Nineteenth Century

The early nineteenth century saw a remarkable expansion in the specialization of greenhouse structures. Continuing advances in production and the resulting availability of glass and innovations in cast iron technology brought about rapid change during the rise of the industrial age. The concurrent rise in availability of exotic plant species led to increasing variety and specialization in greenhouse structures. By the mid-nineteenth century a high degree of specialization had been achieved, as the description of a remarkable group of greenhouses built by Caleb Cope demonstrate. Cope, president of the Pennsylvania Horticulture Society between 1842 and 1851, owned the country seat Springbrook on the Bristol Pike at Tacony, north of Philadelphia. An account, published in A.J. Downing's *Horticulturist* in 1849 describes the greenhouses:

connected with the dwelling is a span-roofed conservatory ... including a carriage entrance, under glass Further south is another span-roofed house, 32 feet long; one side for Geraniums, embracing 60 of the finest sorts, and the other side for choice fancy Roses, many of them now in full bloom. Connected with this house is another, similar to it, for Azaleas, Rhododendrons, and other showy blooming plants of like treatment Contiguous to the flower garden is the "Cactus-house," 81 feet long, heated by water pipes, and containing a collection of Cactii far surpassing any other in this country....To the right of this is the orangery, 38 feet long....Back of the house, and fronting the flower garden, is the Orchid-house, 38 feet long²⁰

²⁰James Boyd, *A History of the Pennsylvania Horticultural Society, 1827-1927* (Philadelphia: Printed for the Society, 1929), 446-447.

Because of the plasticity and strength of the material, the development of the iron structural frame played a crucial role in the diversity of shapes and expansion of size of greenhouses, and greatly facilitated this specialization. Iron allowed sash first to become curvilinear, and then ultimately to be freed from virtually all masonry support. Cast iron sash was used in houses in England as early as 1800, and great innovations in curvilinear houses were made by J. C. Loudon and others in England around 1815.²¹ Iron technology had advanced to the point where Joseph Paxton and Decimus Burton's design for the Great Conservatory at Chatsworth was possible by 1836.²² In this country, however, curvilinear houses and extensive use of cast and wrought iron for this purpose did not occur until at least the 1840s. One possible earlier example is known to have existed, the extensive greenhouses of John Perkins Cushing,²³ built in Boston, probably after 1831.²⁴ Cushing "embellished his

²¹See Woods and Warren, 112.

²²This made use of the famous "ridge and furrow" system, invented by Loudon, which Paxton later used in the London Crystal Palace of 1851.

²³Cushing was likely a relative of Samuel Gridley Perkins, with whom Nicholas Biddle corresponded and from whom he obtained grape plants. See "Grapes" chapter, below.

²⁴According to Tamara Plakins Thornton, in her *Cultivating Gentlemen, The Meaning of Country Life among the Boston Elite, 1785-1860* (New Haven and London: Yale University Press, 1989), 151, Cushing, a merchant in the China trade, returned from that country in 1831, and thus must have built his greenhouses after that date.

half-dome with Moorish arches and built a baroque gabled brick wall to silhouette the semicircular lantern."²⁵

Although little evidence survives to provide details about the materials and exact construction of Philadelphia greenhouses in the second quarter of the nineteenth century, a significant body of information does exist in the records of the Pennsylvania Horticultural Society. In 1830, three years after this organization was founded, a committee visited "Nurseries and Gardens in the Vicinity of Philadelphia" and reported their findings in the *Register of Pennsylvania*.²⁶ Among twenty-six gardens described, most contained noted greenhouses. The descriptions of them are salient features of these accounts. The committee's report on Bartram's Botanic Garden, managed by Robert Carr,²⁷ includes the following:

the exotic department is also very rich, consisting of 900 varieties, besides a splendid collection of more than 800 Camellias, containing 36 sorts. The green and hothouses are 196 feet long, and much framing is in use.²⁸

One particularly telling account is given of "Thomas Hibbert's Exotic Nursery," which

²⁵Woods and Warren, 139.

²⁶These reports are transcribed in Boyd, 424 ff.

²⁷Carr had married into the Bartram family, and was an important figure in Nicholas Biddle's vineyard venture (see "Grapes" chapter below).

²⁸Boyd, 427.

was commenced seven years ago, on a lot in Chestnut street, with only one small greenhouse, and such has been the rapid increase of horticultural taste, particularly in ornamental gardens, in Philadelphia and its vicinity, that Mr. Hibbert has found it necessary to erect green and hot houses to the extent of 321 feet! some of them 27 feet wide; and these are found much too small to supply the increasing demand!²⁹

Two important Philadelphia publications yield a sense of the state of greenhouse technology in the city in the early nineteenth century. Bernard M'Mahon's *American Gardener's Calendar* (1806), discussed above, and Roberts Buist's *The American Flower Garden Directory* (1839), give precise instructions for both the design of heating systems and sash construction as well as hothouse size and shape. In respect to "forcing-frames" whose purpose M'Mahon describes as forcing "flowers and fruits to early perfection, by aid of artificial heat," he states that

the length may be from ten to fifty or one hundred feet; the width from five to fifteen, and from five to ten high; having an upright wall back wall, of wood or brick; and a front of glass work³⁰

The 1830 Horticultural Society descriptions quoted above indicate an expansion of scale in the intervening decades. Buist's remarks on length "from ten feet upwards,"³¹ seeming to imply near limitlessness, confirms this. Both M'Mahon and Buist describe wood sash and glazing framing for hot- or greenhouses, and sash using

²⁹Boyd, 429.

³⁰M'Mahon, 36.

³¹Buist, 145.

lapped glass as described above. The size of the panes and their overlap in both cases is precise. M'Mahon specifies

five rows of glass panes, six inches by four, overlapping on another about half an inch, which of all other sizes is the most preferable, on account of their cheapness in the first place, the closeness of their lap, the general strength the trifling expense of repairs³²

Buist, on the other hand, recommends that "the pieces of glass should not exceed six inches by eight, though six by six is preferable; the lappings about one quarter of an inch."³³ Thus, while there is abundant evidence that lean-to glazing technology was neither novel nor unavailable in Philadelphia in the 1830s, it should be noted that its existence in large quantity was unusual, as demonstrated by the description of Bartram's Garden in the Horticultural Society's report.

Both M'Mahon and Buist discuss methods of heating in detail. They describe the placement of the furnace(s) in equivalent manners, that is, on the side opposite the glazing on the rear wall, either centered or at one end,³⁴ as had been prevalent in Europe since the beginning of the eighteenth century.

M'Mahon describes the returning flue system noted above: "... internal flues or funnels, running the whole length of the back wall in three returns, one above

³²M'Mahon, 10.

³³Buist, 149.

³⁴M'Mahon, 40; Buist, 146.

another, and continued in a flue round the front"³⁵ Buist goes into extensive detail in regard to the construction of the furnaces themselves, and specifies dimensions, placement, and the use of cast iron.

Graperies

Nicholas Biddle built his graperies in this period of "increasing demand" in the 1830s noted in respect to Thomas Hibbert's Exotic Nursery by the Horticulture Society. The grapery had been developed as a specialized greenhouse type, however, at least a century earlier in Britain. Its development was partly a function of the generally increased specialization in greenhouses begun in the eighteenth century noted above that greatly accelerated and grew more popular in the nineteenth. While not an exotic in the same sense that citrus fruits or pomegranates were, varieties of the European grape, *Vitis vinifera*, "can scarcely be called a hardy fruit in our climate" as a nineteenth century English author, Patrick Neill, described it.³⁶ He also described the marginal nature of the grape plant's hardiness this way:

in every case [the plant] requires a good aspect; and north of York, a

³⁵M'Mahon, 40.

³⁶Patrick Neill, *The Fruit, Flower, and Kitchen Garden*, American ed. from 4th English ed. (Philadelphia: Henry Carey Baird, 1851), 59.

crop of *dessert* grapes cannot be expected without the aid of a hot wall.³⁷

As Neill's statement implies, these early graperies were not always heated structures, depending on climate and grape variety. *Vitis vinifera* varieties are also marginally hardy in most of New England and the mid-Atlantic region of this country. Also, varieties vary in the temperature needed to achieve desired fruit sugar content. New varieties were developed in this country from breeding indigenous species, and also by crossing them with *V. vinifera*. Many of the crosses were either marginally hardy in many areas or produced better fruit crops in greenhouses (see "Grapes" chapter below).

As early as 1724 there were heated graperies in England of the type that Nicholas Biddle was to build over a century later. A visitor to the Duke of Rutland noted that his graperies, with sloping walls, were "heated with internal flues from Lady Day to Michaelmas ... [in] 1724 [Stephen] Switzer record[ed] that the walls were covered with glass."³⁸ An indication of the relative novelty of the grapery as a building type at the point Nicholas Biddle constructed his comes from the etymology of the terms "vinery" and "grapery." "Vinery" is the older, having appeared in

³⁷Neill, 59-60.

³⁸Kenneth Lemmon, *The Covered Garden* (London: Museum Press Ltd., 1962), 70-71.

common usage at least by 1789, and graperies the newer, first recorded in 1810.³⁹

As is discussed in chapter 2, Nicholas Biddle built his graperies at a moment of great expansion in grape cultivation in this country. General public interest in growing grapes, and hence the construction of graperies, continued to rise in the United States through the nineteenth century. This popularity is indicated in a monograph published on the subject in 1865, which includes the following description of the ascendancy of this greenhouse type:

it is less than twenty-five years since the first cold Grapery was erected on the Hudson. Since the success of the culture of the delicious varieties of the exotic Grape has been demonstrated, the number of graperies has annually increased, and during the last ten years in a very rapid ration, until they have become recognized as possible and desirable, among those even whose circumstances are moderate and limited. The newly- awakened interest in this branch of culture is manifested in the number and variety of books and other publications on this subject, the space devoted to it in the agricultural and horticultural journals, and especially in the increased number of graperies and vineyards which have been erected and planted in the last decade.⁴⁰

Not until the 1920s could it be written that

grape-growing under glass is on the decline in America. Forty or fifty years ago the industry was a considerable one, grapes being rather commonly grown near all large cities for the market, and nearly every

³⁹Compact edition of the *Oxford English Dictionary* (Oxford University Press, 1971).

⁴⁰G.E. Woodward, *Graperies and Horticultural Buildings* (New York: George E. Woodward, 1865), 7.

large estate possessing a range of glass had a grapery.⁴¹

The decline of graperies was due to the rising availability of grapes from two regions, California and Europe, by virtue of refrigerated transportation. At the end of the twentieth century, the term "grapery" has become an oddity, and unknown to most.

⁴¹U.P. Hedrick, *Manual of American Grape-Growing*, rev. ed. (New York: MacMillan, 1924), 192.

CHAPTER 1

NICHOLAS BIDDLE'S "RURAL PURSUITS" AND THE FORM OF THE ANDALUSIA LANDSCAPE

Nicholas Biddle¹ is principally remembered as the President of the Bank of the United States, and as President Andrew Jackson's adversary in the battle over the institution's existence. Like many members of the American elite of the period, particularly in Philadelphia and Boston, "rural pursuits" were an important feature of Biddle's life.

In 1831, Biddle commented on the place of farming in his life at an important moment in the formation of his grape growing venture, which was to occupy a large amount of Biddle's resources (discussed in the following two chapters). In one letter he wrote that "my occupation has not been able to extinguish my fondness for farming,"² and in another that "the only relaxation which my occupations allow is a little farming."³ Farming, however, was more than simple recreation for Biddle, as

¹Biddle's life has been extensively treated in a biography by Thomas Govan, *Nicholas Biddle* (Chicago: University of Chicago Press, 1959). The history of the Second Bank is also the subject of a monograph by Ralph C. H. Catterall (Chicago: The University of Chicago Press, 1903).

²Nicholas Biddle (hereafter N.B.) to Samuel H. Smith, 22 February 1831, Box 10, Craig-Biddle Papers, the Historical Society of Pennsylvania, Philadelphia. This manuscript group hereafter abbreviated CBP.

³N.B. to M. Robinson, 1 March 1831, Box 10, CBP.

it was for an entire class of American "gentleman" farmers. While never the sole means whereby these men earned their living, agriculture was not merely a private hobby, but the locus of a complex system of values crucial to the public persona of each of these men. Biddle was a very active member of the Philadelphia Society for Promoting Agriculture (hereafter abbreviated PSPA). He was its president from 1831 until his death in 1844,⁴ and like

many spokesmen for the PSPA argued that farming--at first sight an intensely prosaic activity--was actually part of a single unity--an ensemble--of concepts, attitudes, and beliefs that formed a peculiarly American whole. Democracy, integrity, valor, pluck, independence, self-sufficiency, courage--all were values that belonged to the farmer and through him, constituted a single strong strand of the national character.⁵

Although they would not have ranked their plant and livestock breeding and cultivation experiments as paramount in their lives, the values manifested by these activities were crucial to this group of men. Tied up in the manner in which they presented their enterprises to others, and the way they considered them themselves, were notions of the welfare of the national economy and morality. Regardless of how much benefit to "the practical farmer" (as they referred to him) their projects may

⁴Stevenson Whitcomb Fletcher, *The Philadelphia Society for Promoting Agriculture, 1785-1955*, rev. ed. (Philadelphia: Privately printed, 1976), 58.

⁵Simon Baatz, *"Venerate the Plough," A History of the Philadelphia Society for Promoting Agriculture, 1785-1985* (Philadelphia: The Philadelphia Society for Promoting Agriculture, 1985), 23.

have provided,⁶ these gentlemen farmers inextricably connected the idea of national benefit to what Biddle referred to as his "relaxation."

One of the richest sources we have for Biddle's views on agriculture is an address he gave before the PSPA at their annual dinner in 1822, some nine years before he became its president. The principal points of the address are centered on efficient and maximally productive uses for farmland. These include recommendations on irrigation and the rotation of crops, and a scheme for raising cattle on roots rather than by pasturing. Connected to this, he urges the cultivation of root crops to feed livestock.⁷ Beyond these straightforward exhortations the address contains Biddle's vision of the place of agriculture. He also describes the position and role in society of men like himself,

... that column of landed proprietors -- the men of the soil and of the country -- standing aloof from the passions which agitate denser communities -- well educated, brave, and independent -- the friends of the government, without soliciting its favours -- the advocates of the people, without descending to flatter their passions; these men, rooted like their own forests, may yet interpose between the factions of the

⁶There was appreciable resentment on the part of "practical" farmers toward the elite on several occasions in regard to their theories. See, for example, Baatz, p. 45. Tamara Plakins Thornton also discusses this conflict in Massachusetts in *Cultivating Gentlemen, The Meaning of Country Life among the Boston Elite, 1785-1860* (New Haven and London: Yale University Press, 1989).

⁷Nicholas Biddle, *Address Delivered Before the Philadelphia Society for Promoting Agriculture at its Annual Meeting* (Philadelphia: Printed by order of the Society by Clark & Raser, 1822), 24-27.

country, to heal, to defend, and to save.⁸

While this passage clearly denotes the elitist and paternalistic sentiments of Biddle and his peers toward the "practical farmer" and lower economic classes in general, his use of the metaphor of a column to stand for himself and others like him is not random. Like many other influential American men of the early nineteenth century, Biddle was intimately familiar with and ascribed to the notion that ancient Greek culture (specifically that of Periclean Athens) constituted the apex of antique civilization and could serve as a model for American culture in many ways. Biddle was one of the leading proponents of this concept in this country.⁹ While the idea that ancient culture should serve as a model for contemporary society and culture had been commonplace since the Renaissance, the eighteenth century notion¹⁰ of Greek preeminence, can, put very simply, be in part credited to the idealist notion that the ancient nation was the seat of democracy, and the culture was associated with notions

⁸Biddle, 38.

⁹See David G. Kennedy, *Greek Revival America* (New York: Stewart, Tabori, and Chang, 1989). Kennedy's work is problematic in many respects, but his emphasis on Biddle's importance within the complex American Greek Revival phenomenon is accurate.

¹⁰The contention that ancient Greek was superior to Roman culture was best known through the writings of Johann Joachim Winckelmann, whose immediate subject was ancient art, although Winckelmann was not the "inventor" of this ideology. Winckelmann was part of a broad and complex eighteenth century discourse on the subject usually referred to as the "Greco-Roman controversy."

of purity and high mindedness. This idea played a complex yet important role in the process of self-definition for individuals in this country in the early nineteenth century. Relatively little polemic literature was written on the subject of the Greek Revival in this country (in comparison, for example, to the tracts written slightly later in England on the Gothic Revival). Among the few is an "Anniversary Oration" address given by the architect Benjamin Henry Latrobe before the fledgling Pennsylvania Academy of the Fine Arts, and published by the *Port Folio* in 1811,¹¹ a magazine edited by Nicholas Biddle. The purpose of Latrobe's address was to promote the fine arts in general, and Greece as a cultural model. As might be anticipated, Greece provides, according to Latrobe, the appropriate democratic model for artistic expression which, Latrobe contends, need not be viewed as decadent, as the Roman model was perceived.

It is a convention of modern scholarship of this period that Nicholas Biddle and his contemporaries made use of Greek architectural forms to denote their aspiration to the purity, high-mindedness, and democracy they ascribed to this earlier society, and to connect themselves with it, as Latrobe's address demonstrates. These forms were, of course, conspicuously evident in Biddle's life, from the facade of the Andalusia mansion house addition to the street fronts of the Bank of the United

¹¹Series 2, vol. 5 (January-June, 1811): appendix to volume: 3-32.

States and Girard College, and were almost billboards for his ideology, to put this presentation in late twentieth- century terms. In describing themselves using the model of Greek antiquity, however, Biddle and his generation were not simply copying uncritically. They did not conceive of themselves as ancient Greeks, rather, their relationship to classical antiquity was intimately connected with their quest for an identity and prosperity for the new nation, and for them as individual American citizens.

Unlike the common connection between the forms of the art and architecture of classical Greek antiquity and early nineteenth century America, relatively little scholarly attention has been paid to broader cultural correspondences and their implications. In particular, Biddle's address before the PSPA demonstrates that the relationship to the model of antiquity was important to contemporary attitudes toward agriculture and horticulture.

Biddle begins his PSPA address, as might be expected, by asserting his and his audience's "natural reverence for ancient nations,"¹² and traces a cultural history for American agriculture from the ancient world through modern Europe, specifically England and France. This tracing of history was a common topos in the discussion of the culture of the educated. It is perhaps most familiar in such subjects as

¹²Biddle, 6-7.

architecture. For example, the definition of "Architecture" in *The Builder's Dictionary*¹³ a 1734 English publication known to have been in many colonial libraries in this country,¹⁴ traces the lineage of its subject from God through Solomon, the Tyrians, the Greeks, and the Romans, with a subsequent Gothic and Moorish decline, (despite the efforts of "*Charlemagne*[who] set himself industriously about [architecture's] Restoration"), ending with rehabilitation at the hands of the (Renaissance) Italians and French. Obviously, this lineage is both classicist and Christian, Biddle's, however, is salient in its omission of Christian overtones. This may in part be connected to his emphasis on the "scientific management of lands."¹⁵

Despite this "natural reverence," Biddle goes on in his address to develop a favorable comparison between contemporary American agriculture and that of the ancients, on two bases.¹⁶ The first, in regard to Greek cultivation, is on what might be called "nature" itself:

Attica is a small and ridgy poor district of land, about one-third as

¹³(Reprint, Washington: Association for Preservation Technology, 1981). The publication is unpaginated.

¹⁴*ibid.*, preface.

¹⁵Biddle, 7.

¹⁶This favorable comparison between one's own, modern enterprise and the activities of the ancients has a history which goes back to the Renaissance. See G. W. Pigman, "Versions of Imitation in the Renaissance," *Renaissance Quarterly* 33 (1980): 1-32.

large as the neighboring county of Bucks,¹⁷ with a very light calcareous soil, so dry, that it would not yield pasture to support the cavalry employed in its defence [sic]...."¹⁸

In addition to this contrast of scale, and the implied contrast of quality, a later description amplifies the sense of Biddle's feeling for the soil on which Andalusia was built: "according to the opinion of a very distinguished geologist, Mr. Maclure, Pennsylvania contains more good land than any Atlantic state in the union"¹⁹

On the other hand, there are several of what might best be classified as issues of morality and judgment that impaired the Romans, according to Biddle. First of these is superstition:

when, for instance, we read in Cato a minute description of an incantation, by which the dislocated bones of a farmer may be charmed back into their places--when Columella directs us to save our vines from mice, by trimming them at night during a full moon--when Sotion declares that an effectual mode of extirpating broom-rape from the fields, is to draw on five shells the picture of Hercules strangling a lion, and bury one in the middle and one in each corner of the field--when Democritus will ensure us a thriving garden, if we bury an ass's head in the middle of it--and when no less than five of the most sober writers gravely describe the remedy by which the broom-rape may be driven from all fields, and caterpillars banished instantly from gardens, which was to make a barefooted, half-clad woman, with her hair dishevelled, walk three times round it--when these, and many similar directions are given by the great masters of the science, they must be received as

¹⁷ Andalusia is located in this Pennsylvania county.

¹⁸ Biddle, 7.

¹⁹ Biddle, 17.

evidences of its extreme imperfection.²⁰

In addition, while not directly decrying slavery as an evil institution,²¹ Biddle implies that it was part of a climate of "inequality" in late Republican Rome that permitted wealthy citizens to own and control too much land for the common good.²²

Biddle does not offer a model from another ancient culture to supplement those he has found wanting. Rather, he proposes new practices based on science. He thus supplements (even supplants) history. This turn from historical models toward the present is an interesting "pre"-echo of the theoretical writings of Ralph Waldo Emerson, although it is not suggested that there is any direct, causal relationship between Biddle's writings and those of Emerson. The over-riding presence of history, particularly classical history, as a persistent *cultural* means of self-identification is nonetheless clear in the address.

Another extremely important feature of Biddle's values is reflected in a passage in the address which develops the theme of Pennsylvania land following the introductory section. In this later section, he decries the lack of "improvement" in

²⁰Biddle, 10-11.

²¹His views on slavery seem to express ambivalence to modern readers, while calling slaves the "unhappy class of persons in our time" he goes on to say that their "misfortunes are alleviated by tenderness, and [their] increasing numbers are at once the evidence and the reward of humanity" (p. 9).

²²Biddle, 8-9.

central Pennsylvania, and posits that "[this lack] has condemned to barrenness a magnificent region, that should have been filled with wealth, with intelligence, and power." He further describes this "one unbroken wilderness" as a "calamity," from which should be derived "a great lesson, not merely of agricultural, but political wisdom."²³ Nostalgia for lost wilderness is often associated with British eighteenth-century landscape gardening and with popular sentiment in the mid to late nineteenth century here. But this was far from a popular idea in Biddle's day, particularly in Philadelphia, and clearly Biddle had no such sentiments, as the address indicates. Land not put to use was land that made no contribution to the national (or personal) economy.

All of these notions about landscape and culture, both ancient and modern, affected the form of Andalusia. There was, as one might expect, given the sentiments quoted above, no "wilderness" at Andalusia in the sense of the late eighteenth-century English fashion for wilderness gardens according to the aesthetic theories of Uvedale Price and Richard Payne Knight on the picturesque. Neither was there an iconographic program that connoted ancient gardens in the manner of earlier eighteenth-century British gardens. Usefulness was carefully and significantly interwoven at Andalusia. By the barometer of English fashion, Andalusia's landscape

²³Biddle, 18.

may seem *retardataire*, but its form reflected many of the distinctly American attitudes expressed in Nicholas Biddle's PSPA address.

From the evidence of both images²⁴ and written description, the areas around the main house (the areas seen most by visitors), that is, the space between the house and the river and the area along the entrance road to the southwest of the house, were apparently formed on the principles of English landscape gardening of the mid-eighteenth century. It had a smooth, manicured lawn strategically interrupted by clumps of foliage. The overall effect, as represented in the paintings and indicated on the plan, is like that of the mid-eighteenth century work of the Englishman Capability Brown (on a much smaller scale), and is in the manner of what A. J. Downing was later to call "the Beautiful" in his 1841 *Treatise on the Theory and Practice of Landscape Gardening*. It is not, significantly, a landscape that corresponds to Downing's "Picturesque," a rough, wilder aesthetic. It is interesting to note that Biddle, in an 1815 plan made of the areas nearest the house²⁵ referred to these as "clumps," a term associated with mid-eighteenth century English landscape gardening as practiced by "Capability" Brown and Humphrey Repton. The specific composition of Biddle's "clumps" is unknown. The date of this plan corresponds to

²⁴See plates in Wainwright, 6-7.

²⁵Box 29, CBP. The purpose of this drawing was primarily as a planting plan of a group of fruit trees he had bought from Bernard M'Mahon. This will be discussed in the first section of the next chapter.

the period when, after the death of his mother-in-law in January, 1814, he would have first been in primary control of Andalusia, and would have begun to leave his mark there. Another, undated although perhaps contemporary plan,²⁶ shows a larger area with a keyed planting plan for several crops in numbered fields to the northwest of the house. These fields are separated from the immediate precinct of the house by a band that Biddle labeled "woods." The character of the appearance of this area is unknown, but it is quite probable that it was considered as another kind of crop field, a potential resource to be harvested as necessary.²⁷ The area around the house is divided into the "Back lawn" and "front lawn" (corresponding to the first plan discussed), and the "Orchard" to the north of the "Back lawn." The area to the north of the "front lawn," while unmarked on the plan, is also given as "Lawn" in a key to the map on the reverse.²⁸

From these plans, it seems clear that the landscape at Andalusia was zoned

²⁶Box 29, CBP.

²⁷It should be noted that, first, the plan includes thinning trees with "a dead top" in this area, and second, that James Biddle, descendent and current member of the family in residence, has described these woods as uncut for crop cultivation. It is possible that Nicholas Biddle considered these a capital resource, or that this area was unsuitable for cultivation for some reason.

²⁸This key is somewhat confused, since there are numbered notations on both the front and the back of the plan, and more than one number appears in several of the quadrants. It is probable this map was begun by someone other than Biddle, and that Biddle added annotations to it at a later date, or that Biddle made annotations on more than one occasion.

into an area of more aesthetic emphasis near the house, with more utilitarian, intensely cultivated areas farther away, separated by the intermediate area of woods. The collection of exotic plant species and the cultivation of ornamental gardens and specimen trees seems not to have been part of this scheme. Very significantly, however, the cultivation of fruit was integrated into this more "aesthetic" zone, and not separated into the more utilitarian crop areas.²⁹

Biddle is also known to have carefully planned and recorded several of his agricultural ventures at Andalusia, beyond the simple bookkeeping necessary to monitor the expenditure of his capital. The character of his involvement in the affairs of the farm is evidenced by a number of documents. For example, like many of his peers, Biddle spent an enormous amount of capital and time on the buying and selling of *Morus multicaulis*, or mulberry trees, toward silk production.³⁰ Biddle also devised complex projections for revenue from a flock of Merino sheep, another agricultural vogue of the time in which he became involved.³¹

Ultimately, Biddle came to devote increasing amounts of time to his farming ventures, particularly viticulture or grape raising. When he invested large amounts

²⁹See "Fruit" section in next chapter.

³⁰This is remarked by Wainwright. Biddle's correspondence, Boxes 11 and 12, CBP, give a detailed picture of this venture.

³¹Box 29, CBP.

of capital in the transformation of his country seat in the 1830s, he was probably greatly influenced by classical models for which he expressed a "natural reverence" in his PSPA address.

Biddle chose to transform the main house and to build the graperies (among other changes), at a moment when his business career had reached a crucial point, at the height of his fight for the Second Bank's existence. In 1833 United States deposits were removed at the behest of the President, and the Democratic victory in the 1834 election "meant that there was no longer a chance for the Bank to gain a recharter from the Congress before the present one expired."³² The specific reason for his decision to transform the house and build the graperies at this juncture is not known, but the workmen's receipts³³ that reflect the progress of construction at Andalusia also show that Biddle was making renovations to his city house on Spruce Street in Philadelphia at the same time, beginning only slightly earlier. Biddle had begun to invest both considerable amounts of labor, mental effort, and capital in the enterprise of creating a vineyard at Andalusia in 1829 (see "Grapes" chapter, below). Two principal motivations present themselves as the most possible for these activities. First, that in the initial decision to transform the city house and the mansion at

³²Govan, 277.

³³These receipts (CBP) will be discussed at length in the "Grapes" and "Graperies" chapters below.

Andalusia, Biddle was making an assertive, public statement about his values and position, as well as the health of the Bank as a national institution. On the other hand, Biddle may have been preparing Andalusia as a place to which to retire from the travails of public life at the close of a career he may have seen disappearing, or at least transforming.

In this, he would have been following American precedent in part based on classical, particularly Roman, models, the most salient of which was Cincinnatus, the general who retired to his farm until recalled to duty by the people. Before Biddle, James Logan, for example, William Penn's secretary and administrator, moved to 1730 to Stenton, his grand "plantation house", noting in correspondence that he was removing himself from the bitter struggles of his career.³⁴ While these men may have called it "rural retirement" a contemporary term, they did not retire in the late twentieth century manner of cessation of work. Rather, they occupied themselves with the agricultural avocations so dear to them.

³⁴See Raymond V. Shepherd, "James Logan's Stenton: Grand Simplicity in Quaker Philadelphia" (MA Thesis, University of Delaware, 1968), 11-12.

CHAPTER 2

GRAPES

Fruit

Pomology, the study and cultivation of fruit, held a significance for American culture in its early period that has been largely lost to the late twentieth century.¹ A particularly interesting indication of the meaning of fruit cultivation is contained in Thomas Jefferson's *Notes on the State of Virginia*. His discussion of private architecture under the general rubric of "Colleges, Buildings, and Roads" includes this commentary on the state of both private architecture and food cultivation among different economic classes:

the private buildings are very rarely constructed of stone or brick; much the greatest proportion being of scantling and boards, plaistered with lime. It is impossible to devise things more ugly, uncomfortable, and happily more perishable. ... The wealthy are attentive to the raising of vegetables, but very little so to fruits. The poorer people attend to neither, living principally on milk and animal diet. This is the more excusable, as the climate requires indispensably a free use of vegetable food, for health as well as comfort, and is very friendly to the raising of fruits.²

¹Elizabeth McLean notes that fruit trees had been a particular feature of Philadelphia gardens in the eighteenth century, "Town and Country Gardens in Eighteenth-Century Philadelphia" in *British and American Gardens in the Eighteenth Century*, Robert P. Maccubbin and Peter Martin, eds. (Williamsburg, VA: The Colonial Williamsburg Foundation, 1984): 136-147.

²Thomas Jefferson, *Notes on the State of Virginia*, William Peden, ed. (1954; reprint, New York: W. W. Norton & Company, 1972), 1152.

This passage not only constitutes an implicit argument for the value of permanence in respect to the architecture, but also indicates several associations with the cultivation of fruit. First, that pomology is an appropriate activity for the wealthy, and second, that it is allied with (although not casually connected to) the notion of permanence for which Jefferson is arguing. Thus one can plausibly extrapolate an association between the culture of fruit to "culture" more broadly. Fruit is a relative of the elite permanence discussed in the previous chapter in connection to Nicholas Biddle's PSPA address.³

One of the earliest American works devoted exclusively to the subject of fruit is A.J. Downing's *The Fruit and Fruit Trees of America*.⁴ Downing, writing later than both Jefferson and Biddle, corroborates the elitist connotations of fruit cultivation, and the connection of this activity to Greek Revival notions. Downing addressed himself to a kindred, that is educated, audience, and begins his discussion of fruit cultivation in an exhortatory fashion, urging his countrymen to the growing of fruit in a manner remarkably similar to that of Biddle's in his PSPA address in

³It should be noted that certain species of hardwood trees also had elite connotations in eighteenth-century Britain, particularly oaks. See Stephen Daniels, "The Political Iconography of Wodland in Later Georgian England," in *The Iconography of Landscape*, Denis Cosgrove and Stephen Daniels, eds. (Cambridge: Cambridge U.P., 1988), 43-82.

⁴New York and London: Wiley and Putnam, 1846.

regard to the cultivation of root crops. In a comparison strikingly like Biddle's discussion of Bucks County soil, Downing addresses fruit production in this country:

the classical antiquarian must pardon one for doubting if, amid all the wonderful beauty of the golden age, there was anything to equal our delicious modern fruits -- our honied Seckels, and Beurrés, our melting Rareripes.⁵

Clearly, Downing has here moved one step further beyond Biddle from historicism.

It is very interesting to note in this regard, however, that Downing's discussion of each fruit begins with its history. Downing's description of the history of the grape, the fruit which was to occupy more of Nicholas Biddle's time, capital, and energy than any other, is particularly noteworthy:

the history of the grape is almost as old as that of man. Growing in its highest perfection in Syria and Persia, its luscious fruit and the unrivalled beverage which its fermented juice affords, recommended to the especial care of the patriarchal tillers of the soil, and vineyards were extensively planted, long before orchards or collections of other fruit tree were at all common.⁶

It can be assumed that this sort of recitation of history would have been familiar to Biddle, as would many of the associations between history and culture, bounty, this country, grapes, and fruit in general contained in these passages.

There are no published writings by Nicholas Biddle specifically on the subject of fruit. The Andalusia records, however, reflect an interest in pomology on his part

⁵Downing, v.

⁶Downing, 218.

from an early date. An 1815 receipt from Bernard M'Mahon,⁷ attests to the acquisition of over one hundred peach and nectarine trees, and is annotated with planting destinations at Andalusia. A plan with writing in Biddle's hand (discussed in the previous chapter), is clearly connected with the annotated receipt from the matching date and coinciding references. The plan shows peach, apricot, nectarine, and plum trees planted both to the northwest and southeast of the house, in the "aesthetic" zone adjacent to the main house, as described above. This pomological undertaking was certainly not small. It was not as extensive, however, as either the vineyard project Biddle took on nearly fifteen years later or the subsequent graperies. It should be noted that Biddle's later devotion of his energy to grapes in the vineyard and grapery projects did not eclipse his interest in the cultivation of other types of fruit. A receipt from May 1841 to John Smith, Jr., then Biddle's gardener, records the acquisition of some 71 trees: pears, plums, cherries, peaches, and apricots. Many of these are described as "dwarf" and "standard." It is possible that some of these were planted between the grapery ranges.⁸

Whatever fondness Biddle may have had for fruit trees, there is every

⁷Box 24, CBP. As noted in the previous chapter, this was a period when Biddle first began to have primary control over the landscape at Andalusia. As noted in the Introduction, M'Mahon was the Philadelphia nurseryman and the author of the first book of gardening for the American climate.

⁸According to James Biddle, this was the practice.

indication that no pomological venture was more consuming for him than the raising of grapes. The cultivation of this fruit, enormously rich in classical as well as other historical association, was to take up a remarkable amount of capital, time, and energy, as the following section will reflect.

Nicholas Biddle's Grape Cultivation

The first indication of Biddle's interest in growing grapes as more than a relatively small feature of a vegetable garden or fruit orchard appears in 1829. A clear picture of the vast scale and the seasonal progress of this venture, as well as Biddle's thoughts on his enterprise, can be gleaned from his day book of 1829, his vineyard expense book for Andalusia for the years 1829 to 1832,⁹ and from correspondence from 1831 through 1840.

The vineyard expense book for 1829-1832 and the 1829 day book are not unique descriptions of Biddle's plans and projects for his agricultural undertakings at Andalusia. The fruit tree planting plan, M'Mahon's annotated bill, and Biddle's field crop layout map discussed above are other surviving instances. The vineyard account book is the most detailed of these surviving documents both in size and

⁹This designation for the account book is my own and not Biddle's: it is unlabeled. I use this name in order to differentiate it from other account books Nicholas Biddle kept, since this was the only type of expenditure listed in it. Both books are in Box 29, CBP.

narrative content, a strong indication of the relative importance to Biddle of this undertaking.

In those four years, the first planting varied between the end of March and late April. The combined amount of plant material put in is formidable,¹⁰ and Biddle's goal, as he noted the first year, was to "fill the place." Biddle introduces his project in the vineyard expense book by saying that he "began to plant vines in the lawn of And^a." This, and his statement in the 1829 day book that the plantings were made "from the woods to the House," indicates that the vineyard was planted in the area northwest of the mansion house. If Biddle followed the calculations of the number of plants per acre that he recorded in the first page of the vineyard expense book,¹¹ the area covered would have been between approximately 2.7 and 3.5 acres. Initially, the greatest number of plants were from cuttings, with a total of 4258 in 1829. These were mostly Alexander, but also some Isabella, both dark-colored varieties and identified as the same grape in at least one source.¹² A relatively small number of rooted plants, either 54 or 55,¹³ were planted in addition to the cuttings. Biddle's

¹⁰See Appendix A.

¹¹These were from Robert Carr at Bartram's Garden. See Appendix A.

¹²Hedrick, *Manual of American Grape-Growing*, 391. Hedrick identifies the ancestors of both as *Vitis labrusca* and *V. vinifera*, making it a cross between an American and a European species.

¹³The day book and the vineyard expense book differ on this, see Appendix.

initial grape plants cost him \$72.50.

In this first year, Biddle also recorded expenses for hiring men to plant and plough specifically for the creation of his vineyard, and the purchase of laths for support. All of this effort, however, proved ineffectual in attaining the intended result. Biddle reported his "hard experience":

this proved an entire failure - The roots did not thrive the cuttings did not grow well - and in the course of the winter of 1829-30 so many were killed that in the plantation of 1831 we gathered together the remains & planted them together near the woods to fill up spots in the new plantation.

In 1830 he again tried cuttings, planting approximately an equal amount, at least 4200. These also failed, however, prompting this comment from Biddle:

Stimulated by these failures I now resolved to go seriously to work and not laying so much stress on cuttings to adopt the system of planting rooted plants.

It is remarkable that he seems to have considered that the amount of effort expended to that point did not constitute serious work. One gets a sense of this man's enormous drive and ambition when one reflects on the amount of accomplishment he brought about in viticulture in the following five years.

In the first two years, all of the grape suppliers who have been identified¹⁴ were from the Philadelphia area. Acquisitions were from two types of sources. First,

¹⁴Three are unclear because of Biddle's handwriting. They appear to be "Dr. Hedings," "John Lerpant," and "Mr. Maher."

purchases made from commercial nurserymen in the Philadelphia area represented the bulk of the plant material. These plantsmen included Robert Carr of Bartram's Garden, Mrs. M'Mahon (the widow of Bernard P. M'Mahon), and E. H. Bonsall. Second, fellow prominent Philadelphians gave grape plants and cuttings to Biddle. These men included Stephen Girard (who gave cuttings in the two years preceding his death in 1831), Henry Pratt, the owner of Lemon Hill, and Louis Clapier, who, like Girard, made his money as a merchant, particularly in the China trade. All three of these men were visited in 1830 by the committee from the fledgling Pennsylvania Horticultural Society discussed in the first chapter. In the case of Girard and Clapier, they were noted for their prominence in pomological expertise in these accounts.¹⁵ As remarked in the introduction, Lemon Hill's was one of the most extensive plant collections in the country at the time. Biddle names a third, significant source: "cuttings from the grapes in the garden at And^a."¹⁶ The vineyard expense book gives a location for the 1830 cuttings: "the Piazza Vine of the Arbor in the Garden."¹⁷ Clearly, though, only grapes were planted in the new vineyard enterprise; this was not a garden that included grape vines in a mix of other plants, as had been the case

¹⁵Boyd, 439-40; 443-5.

¹⁶1829 day book.

¹⁷The precise location of this is unknown. It is most likely that the "garden" referred to here was in the vicinity of the "orchard" noted in Biddle's annotated site plan discussed in the previous chapter, in the general area of the later graperies.

before 1829. It is possible, however, that the fruit trees recorded on the 1815 plan on the northwest side of the house may have survived (if they were planted in Biddle's designated location).

As Nicholas Wainwright notes,¹⁸ Biddle began a correspondence with expert growers on grape culture and suppliers for plants in the following year, 1831. His initial reliance on a large number of cuttings, and his turn to sources outside Philadelphia after the failure of these plants probably reflects a lack of rooted stock in the area of the city when he wished to establish his vineyard.

Biddle began his 1831 inquiry into suppliers in February, with letters to two men, one in Washington and one in New York. Their specific connection to Biddle is unknown, perhaps they were acquaintances or business associates, but certainly they were men of roughly the same social level as Biddle. Since they were familiar with suppliers, Biddle may have gone to them for their viticulture knowledge. In both cases, Biddle wrote to these men with the grape growers from whom he wished to purchase in mind, and sought information on available stock or prices from these presumed experts.

In his letter to Samuel H. Smith in Washington¹⁹ he inquired about J. W. Pairo, who "advertise[d] in the Washington paper that he has grape vine roots to

¹⁸Wainwright, 27.

¹⁹22 February 1831, Box 10, CBP.

dispose of," and also asks that "if you could extend your enquiries to Mr. Adams's stock, it would be very acceptable." In the latter, Biddle apparently mistook the name of John Adlum, an important promoter and grower of the Catawba variety, and author of the 1823 *Cultivation of the Vine*. The 1831 vineyard expense book entry reflects Biddle's choice of Adlum, from whom he bought 500 Catawba plants. While Smith's reply to Biddle's initial request is lost, Biddle's response makes this decision clear. Biddle wrote

I do not see any thing [sic] which I cannot procure more readily here or at New York, except the Catawba of which Mr Adlum and Mr Pairo possess some, tho' the latter sells them at 15, the former at 20 cents apiece, while neither says how old the roots are. The difference of price tho' considerable may be well deserved by superior merit - and I suppose that Mr Adlum from being a professional gardener may have had leisure to take more pains.²⁰

The assumption that Biddle wrote to Smith as a fellow "amateur" grape grower is confirmed by Biddle's polite refusal of Smith's offer of cuttings. Smith also included cultural suggestions in his final letter to Biddle: "I would recommend in planting them a moderate supply of compost manure, & [illegible] lime, spent ashes & dung."²¹

The suppliers that were the subject of Biddle's enquiry to M. Robinson in New

²⁰N.B. to Samuel H. Smith, 5 March 1831, Box 10, CBP.

²¹Samuel H. Smith to N.B., 12 March 1831, Box 10, CBP.

York²² were Alphonse Loubat "the successor of Mr Parmentier"²³ and "Mr Prince." This second refers to the Prince Nursery on Long Island, another supplier which, like Bartram's, was founded in the early eighteenth century and remained in the Prince family. Ann Leighton fixed the place of the Prince Nursery in American horticulture by noting that it was "so successful and well known that it was carefully spared by both sides during the Revolution."²⁴ The establishment continued to prosper into the nineteenth century, "lead[ing] all others in size and number of species and varieties for sale."²⁵ William Robert Prince wrote *A Treatise on the Vine*²⁶ in 1830.

A letter from Robert Carr to Biddle dated March 1831²⁷ supports the

²²1 March 1831, Box 10, CBP.

²³According to Ulysses Hedrick, in *A History of Horticulture in America* (1950; reprint, Portland, OR: Timber Press, 1988), 227, "Though he was in America but a short time (he arrived in 1824 and died in 1830) Andre[a] Parmentier was the first man really to make a mark as a professional landscape gardener on this side of the Atlantic. Upon reaching this country, Parmentier gave his time and money to found a botanic garden ... here at one time he had, besides pears, grapes, and other fruits, some 400 species of ornamental trees and shrubs, probably the largest collection of such plant materials in America." See also Ann Leighton, *American Gardens of the Nineteenth Century* (Amherst: University of Massachusetts Press, 1987), 124-132.

²⁴In *American Gardens of the Nineteenth Century*, 68.

²⁵Hedrick, *A History of Horticulture in America*, 209.

²⁶The expanded title is *A Treatise on the Vine; Embracing its History from the Earliest Ages to the Present Day*, a copy is in the collection of the Library Company of Philadelphia.

²⁷Box 10, CBP.

hypothesis that Biddle's turn to sources outside Philadelphia was due to a local lack of rooted stock, and also reflects Carr's role in Biddle's subsequent decision of Loubat over Prince. Carr, the contemporary proprietor of the botanic garden and nursery started by John Bartram in the early eighteenth century on the west side of the Schuylkill, had established a vineyard at Bartram's prior to 1830, as the visiting committee for the Pennsylvania Horticulture Society noted in describing the business:

On the south of the garden is a field of three acres, preparing a vineyard, as an addition to the one already planted. Mr. Carr has 145 sorts of grapes, and has produced very good wine for some years past.

Carr's letter to Biddle reflects the formative and perhaps fragile state of this vineyard venture at Bartram's. He tells Biddle that "many of my young plants are yet too weak to sell" and that

In my foreign vines I have no confidence, until they bear, as the European nurserymen have, generally, been very careless in affixing the names to the plants sent here.

Carr does recommend one local source, Bonsall, from whom Biddle had obtained a large number of cuttings (4300) the previous year. The main purpose of the letter, however, is Carr's assessment of the two New York nurserymen, about whom Biddle must have asked Carr's opinion. While Carr's views were probably colored by a certain measure of professional rivalry, Biddle seems to have thought enough of his opinion to take his advice. Although Carr connects Loubat with the problems he associated with European varieties (thereby identifying the latter grower's source and

types of grapes) quoted above, he assures Biddle that "Mr Loubat has had an opportunity, no doubt, to correct the mistakes in names, as many of his vines are now bearing." His opinion of the other grower is of an entirely different stripe, that is, "you cannot rely on a word Prince utters: - he would sell you two sorts under 20 names." While this view may not have been the only factor in Biddle's decision, it certainly was a strategic one. Additional evidence of Carr's advisory capacity appears in Biddle's annotation to the list of varieties sent by Robinson from Loubat. To the Auvergnat, a white grape variety that Biddle ordered, is added the comment, "Col Carr prefers".²⁸

Biddle's correspondence with Alphonse Loubat²⁹ is fairly extensive. As the Expense Book shows (see Appendix), he did supply Biddle with by far the most rooted plants for his vineyard. These represented the greatest expenditure of the project to a grower.³⁰ Biddle's letters to Loubat also reflect the problems encountered in growing unprotected grape plants at Andalusia, and indicate one of the factors in the decision to construct the graperies. Biddle ordered in two

²⁸M. Robinson to N.B., 3 March 1831, Box 10, CBP.

²⁹Loubat was also the author of a treatise on grape growing, *The American Vine Dresser's Guide* (New York, 1827). This is short and straightforward work, written in both French and English, consisting in content of simple cultivation instructions based on European methods.

³⁰The total was \$557.33, including costs of transportation and hauling.

installments, the first of 4000 plants, 1000 each of four varieties,³¹ and the second for "3000 more roots," adding the caveat that "if he has no more of the kinds already sent ... let him send the Sweet Guillaut, Meillers, and pied rouge."³² Biddle had apparently exhausted Loubat's available supply before the first order was completely filled, since he recorded in the vineyard expense book that Loubat sent him 3750 for that year. This is confirmed by a letter the following February from Biddle which refers to Loubat's reply to Biddle's 1831 orders. Biddle says that "you were so good as to say in your letter of the 6th of April last, that you could not furnish the roots which I then wanted."³³ Unfortunately, Biddle noted in the Expense Book neither which varieties nor the numbers of each sent.

While Loubat recommended varieties for "unsheltered places,"³⁴ Biddle's first year of planting rooted stock was not very successful, although not the unmitigated disaster of the cuttings. Biddle visited Loubat's vineyard in January of 1832.³⁵ In a letter to Biddle following this, Loubat expressed his opinion that

vous etiez convaincu par vos propres yeux que le défaut de soins, etait

³¹N.B. to M. Robinson, 14 March 1831, Box 10, CBP.

³²N.B. to M. Robinson, 2 April 1831, Box 10, CBP.

³³N.B. to Loubat, 22 February 1832, Box 10, CBP.

³⁴M. Robinson to N.B., 3 March 1831, Box 10, CBP.

³⁵Loubat to N.B., 36 January 1832, Box 10, CBP.

[sic] la seule cause qui avait empêché, la réussite des vignes dans ce pays,³⁶

not realizing that, as Biddle reported shortly thereafter, that

a great many of the vines which I planted last year have failed, so that I have now to make up for numerous deficiencies in the rows.³⁷

Biddle seems not to have been deterred by this setback, blaming it not on the lack of attention which he might have inferred from Loubat's previous letter, but rather on a particularly severe winter. The number of plants Loubat supplied in 1832 differs slightly between a letter from the grower and Biddle's record,³⁸ but Loubat clearly gave 500 at no charge to replace the 1831 loss. Biddle also corresponded with Loubat later in the year³⁹ in regard to the hiring a *vigneron*, or vineyard tender, but his recommendations were apparently not followed.⁴⁰

Biddle's final surviving letter to Loubat indicates the most likely for Biddle's decision to erect the graperies. In April, 1834 he wrote saying that

³⁶Loubat to N.B., op. cit. "You were convinced by your own eyes that lack of care is the only cause that has prevented the success of grape vines in this country."

³⁷N.B. to Loubat, 22 February 1832, Box 10. A subsequent letter to Loubat (12 March) puts the percentage dead at a third.

³⁸Loubat says in a letter dated 16 March (Box 10) that he is sending 2000, Biddle recorded 2100 in the vineyard expense book.

³⁹From August through October, all Box 10.

⁴⁰Biddle wrote on 4 October that "the Frenchman and his wife ... would not suit."

on visiting my farm on Sunday last, I found that almost all the plants which I procured from you last perished during the winter. Not discouraged however, I wish to replace them - and if it is not too late in the season, I will thank you to send me one thousand plants.⁴¹

There is no evidence that these were ever sent, and there is no record of payment.

Despite Biddle's expressed optimism, the fee to Thomas U. Walter for designing the graperies (see following chapter) indicates Biddle's decision to shift direction from growing "the vine" exclusively in large scale field culture in the climate of Andalusia. Given the amount of capital he subsequently expended on the graperies, the emphasis shifted to the cultivation of grapes under glass. Biddle's personal expense Account Book for 1834-1836⁴² includes an expenditure to Samuel Thomas on July 20, 1834 for "posts and rails for the vineyard," indicating that he had not abandoned this experiment altogether. Undoubtedly, grapes also continued to be grown "in the garden," as before, that is, on a relatively small scale.

It is uncertain why the failure of grape plants in Biddle's fields was so extensive, particularly since the varieties were not all of the marginally hardy European grape *Vitis vinifera* species, although clearly winter kill was the immediate cause. One can speculate that particular conditions at Andalusia, exposure due to the

⁴¹N.B. to Loubat, 15 April 1834, Box 11, CBP.

⁴²Biddle Papers, Andalusia (hereafter BPA). This volume is unpaginated. It should be noted that the Biddle Papers examined for this thesis were contained in the main or mansion house, in the Library anteroom.

openness of the land, or the immediate proximity of the Delaware river, may have made the microclimate exceptionally cold, although this is far from sure. One reason that Biddle may have had less success with Loubat's vines, *V. vinifera* varieties, than the grower, is that Long Island, although north of Bucks County, receives more warmth from the Gulf Stream than eastern Pennsylvania.⁴³ The most recent USDA hardiness zone map, issued in 1989, places Long Island in zone 7, and the area of Andalusia in zone 6. While perhaps not specifically accurate in terms of average annual minimum temperature for 1830,⁴⁴ the relative difference in temperature between the two places must have been the same. It is also conceivable that Bartram's, closer to the effects of currents coming into Delaware Bay, may have been just warmer enough to provide a winter circumstance more propitious to grape growing. This could be irrelevant, since the cuttings Biddle bought from Robert Carr were varieties of a native species (see below). Biddle and his contemporaries, of course, did not have the benefit of a system like the hardiness zone map.

Aside from considerations of temperature, because there is little record of Biddle's cultivation practices at this point other than the knowledge from the vineyard

⁴³It should be noted that Loubat's European grapes ultimately failed as well. See Hedrick, *History of Horticulture in America*, 225.

⁴⁴With a minimum of -10° to 0° in zone 6, and one of 0° to 10° in zone 7.

expense book that the plants were receiving water and fertilizer,⁴⁵ it is impossible to pinpoint any specific failure in care. It is possible the *V. vinifera* plants succumbed to phylloxera, which was to become such an extensive problem in California and in Europe much later in the century. The ample evidence, however, that the graperies proved a very successful means by which to cultivate "the Vine" (particularly European varieties) at Andalusia more strongly indicates cold as the likely culprit.

While the graperies were under construction, Biddle corresponded with Samuel G. Perkins in Boston in connection with supplying cuttings for the new venture. Samuel Gridley Perkins, who owned an estate in Brookline, as did his brothers James and Thomas,⁴⁶ was another gentleman farmer whose letters indicate his experience with greenhouse grape cultivation and a number of forcing houses of his own, both cold and hot, as is evidenced by his reference to the time for taking vines in "one of my houses into which I introduce artificial heat."⁴⁷ His first letter to Biddle is a reply to a lost inquiry in which the Philadelphian asked about grape cultivation under glass, since Perkins replies that

we think it best to raise our Vines for houses, in pots in hotbeds, from single eyes, & to put them into the border when ever the House is ready

⁴⁵In the form of manure and "street dirt," most likely horse manure and compost garbage. See Appendix.

⁴⁶Thornton, 148.

⁴⁷Perkins to N.B., 17 December 1835, Box 11, CBP.

to receive them.⁴⁸

Biddle also must have asked about the possibility of obtaining plants from Perkins, who goes on to say that

I can, & will with pleasure furnish you with cuttings of the black Hamburg that may be depended on, the mother plant, from which they were taken, having been sent to me by Dr. Joseph Banks from Kew Gardens many years since (1817).

The pedigree of this plant was certainly impeccable. Perkins plant connections to England went beyond this - he is known to have served the Massachusetts Society for Promoting Agriculture in procuring books from there.⁴⁹ He may also have been related to Thomas Handasyd Perkins, a wealthy Boston merchant whose large greenhouses, discussed in Introduction, were devoted to fruit growing, particularly grapes.⁵⁰ This latter Perkins wrote to Biddle late in 1835, noting that he had received "the acceptable sample of fruit." He went on to wish to Biddle: "may your Mental Vineyard, as well as your natural, be long and successful in full bearing."⁵¹

Both Samuel Perkins's letters and the Grapery and Mansion Account Book⁵²

⁴⁸Perkins to N.B., 20 April 1835, Box 11, CBP.

⁴⁹Thornton, 89.

⁵⁰Thornton, 150.

⁵¹T. H. Perkins to N.B., 17 December 1835, Box 11, CBP.

⁵²BPA.

show that Biddle sent John Smith, Jr., who became his chief gardener at about this point,⁵³ to Boston to collect plants. Perkins gave Smith "letters of introduction to Mr. Cushing & to My Brother Gardener."⁵⁴ The Cushing referred to here was the nephew of Thomas H. Perkins,⁵⁵ and the builder of one of the earliest American greenhouses to incorporate structural iron (see Introduction). Biddle had clearly gone to an experienced "horticultural clan."⁵⁶ Smith brought back from Samuel Perkins "between 60 & 70 grape Vines of different Sorts, & a large parcell of Cuttings of the best kinds." Presumably the other members of the Perkins/Cushing clan provided plants as well, but Biddle did not record the total. It is most likely that these cuttings were planted in the graperies no later than the fall of 1835, when construction had largely been completed (see following chapter).

It is a matter of speculation why Biddle continued to seek sources further north in this country at each step. Perhaps, having concluded that the problem with field grape cultivation was extreme winter cold, he looked increasingly northward to

⁵³This is indicated in this account book, which covers the period of the construction of the graperies and the alterations to the mansion house, from 1834 to 1836. The book is unpaginated, and the back contains a "daybook" section, in which is entered an item for "Smith for pruning vineyard - before he was gardener."

⁵⁴S.G. Perkins to N.B., 19 May 1835, Box 11, CBP.

⁵⁵Thornton, 151.

⁵⁶Thornton, 151.

find a solution. It should be noted that the most recent USDA map places both eastern Massachusetts and eastern Pennsylvania in zone 6. If this had been Biddle's conclusion, his decision to raise *V. vinifera* varieties under glass was one which was confirmed by later nineteenth century writers. George Woodward, in his *Graperies and Horticultural Buildings* of 1865,⁵⁷ noted that

it has been demonstrated by years of experiment, resulting in every case in utter failure, that the foreign grape cannot be successfully grown in the open in the United States - the states of the Pacific excepted - we are obliged to confine our culture to glazed structures.⁵⁸

L.H. Bailey's *Cyclopedia of American Horticulture*, looking back from the turn of the twentieth century, described it concisely this way:

great efforts were made to introduce the cultivation of the European Grape into the American colonies, but the efforts resulted in failure
....⁵⁹

The way in which Biddle chose to obtain plants for his new graperies was certainly less expensive than that by which he had supplied his vineyard, since Biddle spent a total of \$63.17 on the vines brought from Boston,⁶⁰ although the amount of money spent on the graperies themselves (see next chapter) made the total venture

⁵⁷(New York: George E. Woodward).

⁵⁸Woodward, 8.

⁵⁹(New York: Macmillan, 1900), Vol. 2, 666.

⁶⁰Expenditure of 16 January 1836, Grapery and Mansion House Account Book, BPA.

very expensive. It is clear that Biddle went to experts in growing grapes under glass, men of his own class and interests, with the means to both import vines from Europe and cultivate them on a large scale in their expansive, "state of the art" greenhouses.

Grape Varieties

Nicholas Biddle's decision to grow grapes was very much in keeping with the times. The varieties he chose reflect the contemporary state of grape cultivation in America.⁶¹ They also evoke the history of viticulture in Pennsylvania, and the place of this colony in New World grape raising.

Grape growing in this country on the part of European immigrants and their descendants consisted (stated most simply) first, of the introduction of Old World varieties brought with settlers and imported thereafter by their descendants, and second, of the cultivation of North American native species to create new varieties. Breeding new varieties in this country was accomplished both through the use of indigenous species as parents, and by crossing these species with European varieties. The ancestry of the varieties available to growers like Nicholas Biddle in this country in the nineteenth century is not always clearly identifiable.

Among the species encountered here by Europeans, *Vitis Labrusca* has

⁶¹For a complete list of varieties grown by Biddle, see Appendix B.

"furnished more cultivated varieties, either pure-breeds or hybrids, than all other American species together."⁶² Ulysses Hedrick, horticultural historian and grape specialist, reasonably posited that

the reason for this is partly, no doubt, that it is native to the portion of the United States first settled and is the most common grape in the region where agriculture first advanced to the condition at which fruits were desired.⁶³

Contrary to the relative unimportance of viticulture in late twentieth century American society, grape growing was an important endeavor to many European immigrants to this country, both for food and to make wine. Discovery of the abundance of native species likely contributed to the notion that they had reached something like the promised land. Commercial growing was attempted in New York as early as the late seventeenth century.⁶⁴

Grape growing in Pennsylvania was an interest of William Penn. The culture of native grapes, the introduction of European varieties, and the nature of the climate occupied him:

it is disputable with me, whether it be best to fall to fining the fruits of the country, especially the grape, by the care and skill of art, or send for foreign stems and sets, already good and approved. It seems most reasonable to believe, that not only a thing groweth best, where it

⁶²Hedrick, *Manual of American Grape-Growing*, 325.

⁶³Hedrick, *op. cit.*

⁶⁴Hedrick, *History of Horticulture in America*, 58.

naturally grows, but will hardly be equalled by another species of the same kind, that doth not naturally grow there. But, to solve doubt, I intend if God give me life, to try both, and hope the consequence will be as good wine as any of the European contries, of the same latitude, do yield.⁶⁵

Penn did try cultivating a combination of native and introduced grapes.⁶⁶ He had little success with French *V. vinifera*, but more with native species. The Alexander, a variety grown by Biddle, was "first discovered by Mr. Alexander, gardener to Gov. [John] Penn."⁶⁷ Grapes were also an interest of Daniel Pastorius, the founder of Germantown township in northwest Philadelphia. He started a vineyard from cuttings brought from Germany, and also cultivated native plants.⁶⁸

Nicholas Biddle's choices of varieties for his grapery reflect the currents of grape culture in America in the 1820s and 1830s, and were governed by what was available to him. Several varieties of *V. labrusca* were among the grapes cultivated in the vineyard experiment. The Alexander was among Biddle's grapes. The Powel, or Bland grape, which Biddle noted as growing in his garden before he established his

⁶⁵ John F. Watson, *Annals of Philadelphia and Pennsylvania* 1 (Philadelphia: Elijah Thomas, 1857), 46.

⁶⁶ See Boyd, 3, and also Edwin C. Jellett, *Gardens and Gardeners of Germantown*, Site and Relic Society of Germantown [Germantown Historical Society] Historical Addresses, no. 10 (Philadelphia, 1914), 256.

⁶⁷ Downing, 253. Governor Penn was the Proprietor's grandson.

⁶⁸ Jellett, 256.

vineyard, while not of local origin like the Alexander, had an important local connection:

[it] is said to have been found on the eastern shore of Virginia, by Col. Bland of that state, who presented scions to Mr. Bartram the botanist, by whom it was first cultivated.⁶⁹

The Elsenborough was of regional origin, from Salem County, New Jersey.⁷⁰

Among the *V. vinifera* varieties that Biddle grew were those mostly highly regarded at the time. Black Hamburg, which Biddle received from Boston (see above), was noted by Downing ten years later as "long [having] been considered the first of black grapes for the vinery."⁷¹

Both the Catawba and Isabella varieties were American grapes of the moment, and represented contemporary achievements in breeding grapes from native species to rival European varieties in the production of fruit for the table and for wine. The Catawba was introduced by John Adlum (from whom Biddle obtained this variety) in the early 1820s, and became "the grape that was to make grape growing and wine making profitable in America."⁷² Isabella was also a very successful early nineteenth century introduction, this time by William Prince (of whom Robert Carr had no good

⁶⁹Downing, 254.

⁷⁰Downing, 255.

⁷¹Downing, 237.

⁷²Hedrick, *History of Horticulture in America*, 434.

to say), although its discovery is credited to Isabella Gibbs around 1818.⁷³

Grapes in Early Nineteenth-Century America

There is no record of the motivation for Nicholas Biddle's "experiments in the field cultivation of grapes,"⁷⁴ beyond his remark that "the only relaxation which my occupations allow is a little farming."⁷⁵ No document exists for grape cultivation comparable to his estimates for investments in Merino sheep, although there is evidence that the grapes supplied revenue (see "Graperies" chapter below). Why raising grapes on such an enormous scale was considered recreation, and recreation appropriate for Nicholas Biddle and others like him is not explicit in his records. His contemporaries at the same social level, such as Mr. Robinson to whom Biddle addressed the above remarks, needed neither justification nor explanation for this interest. There is ample evidence that grape raising was an enthusiastically pursued pastime among Biddle's peers. The most immediate indication are the sources from which Biddle received cuttings for his vineyard, that is, Stephen Girard and Louis Clapier in the area of Philadelphia, and Samuel Gridley Perkins in Boston. Biddle's

⁷³See Downing, 255-6, and Hedrick, *Manual of American Grape Growing*, 391.

⁷⁴N.B. to Samuel H. Smith, 22 February 1831, Box 10, CBP.

⁷⁵N.B. to M. Robinson, 1 March 1831, Box 10, CBP.

grape-growing coincided with the emergence of an American literature on the subject in the 1820s and 1830s. The interest in grape raising could be most superficially (but not inaccurately) called a fashion or trend, but to limit an explanation to this would be to miss the wider implications of this phenomenon.

Biddle's correspondence is a rich source on contemporary notions about grapes. On two recorded occasions after the graperies had begun producing, fruit was solicited from him for invalids. In the first case, W.H. DeLancey, the rector at St. Peter's Church at Third and Pine Streets in Philadelphia where Biddle was a member, wrote for "a couple of bunches of grapes for a friend who is very sick."⁷⁶ In 1840, Edward Whelen sent Biddle a letter on behalf of "Mr. Corcoran from Washington with whom I believe you are acquainted." He continued that the visitor and his wife were

were in the city yesterday to obtain medical attendance for Mrs. C. who is exceedingly ill. He is anxious to procure for her some fine grapes⁷⁷

It may be inferred from these statements that grapes were considered to be, if not a curative, at least a bearer of health-giving properties which made them appropriate for this purpose, beyond what we consider them to be endowed with today.

These incidents are made more significant in the light of the description of "the

⁷⁶W.H. DeLancey to N.B., 10 September 1836, Box 11, CBP.

⁷⁷Edward T. Whelen to N.B., 19 September 1840, Box 12, CBP.

vine" given by Robert Buist in his *American Flower Garden Directory*⁷⁸ -

we are not aware of any vegetable production that is more conducive to the luxurious gratifications and pleasure of man than the vine. In fact, there is no fruit so delicious, applicable to so many purposes, nor any that is so agreeable to all palates: from the remotest ages the vine has been celebrated as the emblem of plenty, and the 'symbol of happiness.' Its quickness of growth, its great fertility, and astonishing vegetative powers, with its unknown age, has rendered it one of the most fruitful blessings bestowed by Providence; a blessing which almost every inhabitant of this union may enjoy.⁷⁹

Beyond what is to modern readers the remarkable hyperbole of the tone of this passage, several aspects of it merit closer analysis. First, the reference to grape plants as "the vine" (above all others) signals their cultural importance. Buist here was not coining a new usage, but rather following contemporary convention, as examination of the contemporary literature on viticulture alluded to above demonstrates.

The reference to history in this passage is also instructive. Buist was again conventional in this and not solely in respect to viticulture, but to pomology more generally, as discussed in the first section of this chapter. An important portion of the historical associations of grapes were those associated with Biblical references, and accompanying religious associations.

Further indications of the perceived importance of the role of viticulture in early nineteenth-century Pennsylvania, and its mythic associations, is reflected in the

⁷⁸2nd. ed. (Philadelphia: Carey & Hart, 1839).

⁷⁹Buist, 352.

devotion of an entire chapter to the subject in the 1830 edition of *Watson's Annals*.⁸⁰

John Watson began his chapter with this passage:

numerous incidental intimations and facts evince the expectations originally entertained for making this a flourishing grape and wine country. Before Penn's arrival, the numerous grape-vines every where [sic] climbing the branches of our forest trees, gave some sanction to the idea that ours may have been the ancient *Wineland* so mysteriously spoken of by the Norwegian writers. Almost all the navigators, on their several discoveries, stated their hopes from the abundance of grapevines with exultation. But neglecting these we have substituted whisky!⁸¹

In addition to a further example of the symbolic associations of grape vines noted above in the Buist passage, the final nostalgic note of the passage indicates the importance of the historic associations of grapes. The idea that contemporary culture was in a state of decline is not unique to the 1830s, but its most relevant example is in the notions of decline expressed by early Imperial Roman writers, who harked back primarily to the earlier era of Republicanism.

Beyond these conservative, pastoral connotations, which one might assume to have appealed to Biddle and others of his cohort, the associations of grapes with classical antiquity must also be considered. There is no known literature which explicitly makes the grape the Greek Revival fruit, and Biddle is not known to have ever stated that he was following a Roman republican or Athenian pursuit in raising

⁸⁰John F. Watson (Philadelphia: Uriah Hunt), 669-672.

⁸¹Watson, 669.

grapes, but its choice is a logical one for its Classical associations, and the simultaneous emergence of American grape literature and the "Greek Revival Moment" is intriguing. But perhaps most evocative of the associations of fruit in general and grapes in specific, finally, is Thomas H. Perkins's wish to Biddle quoted above, "may your Mental Vineyard, as well as your natural, be long and successful in full bearing."

CHAPTER 3 THE GRAPERIES

The graperies at Andalusia were designed by Thomas Ustick Walter in a campaign of construction whose best-known feature is the Doric temple front addition for the "mansion house."¹ This campaign, centered around 1835, also included in rustic grotto near the Delaware river. Significantly, the graperies were by far the most costly portion of this building campaign, with a total of nearly \$22,000.00 expended, over fifty per cent greater than the approximately \$14,000.00² spent on the changes to the main house. As with all commissions of the era, Nicholas Biddle would have had extensively influenced the design of both projects. There is only one small surviving graphic representation, and no verbal description of the graperies' original appearance. Fortunately, however, the progress and scope of the construction project, and much of its details, are recorded in receipted bills from workers and materials suppliers preserved in the Craig-Biddle papers at the Historical Society of Pennsylvania, and in account books among the Biddle family papers at

¹This building is referred to in this manner in contemporary documents, particularly account book records.

²Wainwright, 24. This figure is confirmed by the Mansion House account book, Biddle papers, Andalusia (hereafter BPA). It should be noted the Biddle manuscripts examined for this thesis were those located in the library of the main or "mansion" house.

Andalusia. From these documents much of the original appearance and construction of the graperies can be deduced. The papers show that the principal work was undertaken during the building season of 1835, beginning in mid-April and continuing through to September, after designs completed by Walter in 1834.³ Finish work, including the initial installation of plant material, continued into 1836.⁴

There have been two major changes to the graperies after their construction. First was the removal of the original glazing and the wall that probably supported them. This was followed by the establishment of a formal garden between the walls near the end of the nineteenth century. Second were alterations and additions to the masonry made by the well-known Philadelphia architectural firm of Mellor and Meigs. The latter changes were made in conjunction with the rebuilding of the stable at the northeast end of the graperies after a fire in 1915 destroyed a water tower in this location. These additions and alterations will be discussed in detail in the next chapter.

³Thomas Ustick Walter Account Books, Collection the Athenaeum of Philadelphia. See Appendix C for transcriptions of the portions of the suppliers' bills (CBP) pertaining to the construction of the graperies.

⁴The Grapery and Mansion House Account Book, BPA, indicates that payments continued for the grapery project through August, 1836. This book is transcribed with some errors in Robert Estill O'Neill, "'Andalusia,' Bucks County, Pa." (M.A. Thesis, University of Virginia, 1975), 80 ff.

Masonry

Today, the graperies' two massive rear walls rise an average of seventeen feet above grade on generally flat terrain to the northwest of the main house.⁵ The greatest mass of the original, and virtually all of the surviving construction are two parallel, masonry walls approximately 280 feet in length and 100 feet apart. Their composition is primarily stone, with several courses of brick at the top of the walls on their southwest sides, and a brick parapet centered over the doorway in the southeast wall. The walls stand roughly parallel to the Delaware River, running from southwest to northeast. The southeast sides of the walls, plastered nearly to the top, were originally fronted by the glazing that was the core of the working graperies. On the northwest side of each wall are four attached sheds (figure 3), also of masonry construction, that held coal furnaces to heat the graperies. These furnace houses are symmetrically placed with respect to two doorways, one in each wall. The doorways are off-center with respect to the full range of the masonry, approximately fourteen feet closer to the southeast ends (nearest the main house). The brick parapet marking the doorway in the southeast wall extends to the edge of the inner side of the flanking furnace houses.

⁵Historic American Building Survey (H.A.B.S.) drawings prepared by John H. Barker and Martin J. Rosenblum, 1974. All measurements are from this source unless otherwise specified.

The walls' two primary materials are stone and brick. Receipted bills document large quantities of both for the project. The stone, although unspecified in Biddle's account books, is mica schist fieldstone (gneiss), and is the facing material for the northwest side of each wall and the exterior of the furnace houses. This stone was also used to face the grotto. The material denotes both of these structures as more rustic, more "natural," as does the Gothic detail of the grotto.⁶ The stone has a natural quarry face which is relatively smoothly dressed, giving the impression on the walls' northwest sides and on the furnace houses of a uniform surface (see figure 3). Although not ashlar cut, the careful coursing of the stone and the size of many of the pieces indicates that the north side masonry was always intended to be seen, and was unlikely to ever have been stuccoed. This conclusion is supported by the total lack of documentary and photographic evidence for stuccoing on the northwest sides, or indication of marking of the surface stone for the attachment of stucco material.

The graperies account book shows payments to five separate stone suppliers between May and July of 1835, for a total of 1287 perches⁷ bought for the construction of the graperies. This is nearly the equivalent of 32,000 cubic feet. The

⁶The association of gothic style and rural retreat and nature dates at least to the early eighteenth century. See, for example, Diana Balmori, "Architecture, Landscape, and the Intermediate Structure" *Journal of the Society of Architectural Historians* 50 (March 1991): 38-56.

⁷A perch is a cubic measure of 16.5' x 1.5' x 1' or 24.75 cubic feet.

volume of the furnace houses and the walls above ground today, calculated from the 1974 H.A.B.S. drawings, is about 695 perches. A significant volume of stone must also be placed in underground foundations, given the height of the walls relative to their depth. This could account for over 400 additional perches if the foundation were three feet wide and six feet down, which would take the level well below frost. This would add at least another 385 perches, and even if the foundation were less generous, the overage of stone would be within expected limits for construction waste. A significant amount of stone may also have been used as the foundation for a front wall. This front wall, which would served as a base for the glazing structure, probably was built for the Andalusia graperies (this will be discussed at length below). Although there are too many variables to make these calculations precise, the amount of stone used on the project indicates that the vast bulk of the surviving walls must be of rubble schist and not of brick. Perhaps the best argument for this hypothesis, given the large volume of brick used in the project (discussed below), is the evidence of the walls themselves. Examination in winter, when the wisteria leaves have fallen from the vines, reveals that in those places where the original plaster has fallen from the masonry (with the exception of the area of the horizontal brick flues at the base of the wall, discussed below) rubble is exposed underneath (see figure 4). Additionally, a brick core with stone veneer surface would have been a much less sound construction technique in a wall so thin relative to its height, without any

bracing, and would have shown more deterioration in the form of delamination of the facing.

A great number of bricks was used in the project. While T. U. Walter's account records for 1834⁸ indicate that 50,000 bricks from the dismantled Philadelphia Almshouse were destined for the project, two other suppliers appear in Biddle's records. "Mr. Wilson" is the first entry in the grapery account⁹ "for 57,000 bricks." The main source, however, was John Snyder and Sons,¹⁰ with a total of 74,850. This included 36,750 dark and 15,500 light stretchers, probably used as face brick laid in a patterned bond in the front wall (discussed below). 22,600 "hard" bricks are also listed in the bill, as well 960 pieces of hollow and 610 of "large flat" tile. It is not possible to calculate the exact cubic measure that the bricks listed in the records represent, given that their dimensions and the amount of mortar set between them are unknown. If it were assumed, however, as a sample calculation, that a cubic foot is the equivalent of eighteen bricks, then the total represents 7325 cubic feet, about 296 perches, or two walls around nine feet tall the length of the surviving

⁸Collection the Athenaeum of Philadelphia.

⁹The entry is for April 16. Grapery and Mansion House Account Book, BPA.

¹⁰The receipted bill is preserved in Box 24, CBP. See Appendix C.

masonry.¹¹

These calculations do not take into account either construction waste or those bricks used in flues and chimneys and in other construction (discussed below). Evidence in the walls themselves, from Snyder's bill, and an additional entry in the grapery and mansion account book of \$45 for bricks for flues to Snyder¹² indicate that the graperies were built with a brick and tile flue system. This served both as the means of conducting heat through the masonry mass and venting the smoke from the coal furnaces (see "Furnaces" section below), the heat source, housed in the sheds on the north sides of the walls. As discussed in the introduction, at the time the graperies were built this was the most prevalent means of producing artificial heat for greenhouses of this size.

The number of pieces of hollow tile that Snyder lists is substantial, a total of 960, but since he gives no dimensions, it is not possible to determine the length of flue this represents. There is no record of the configuration of the flues within the walls, or if pipes were installed in the ground within the greenhouses. It is possible,

¹¹If the masonry is calculated at the length given in the H.A.B.S. drawings, 279.5', the walls would be about 8.7' high, if 265.5', then the walls would be just over nine feet.

¹²This payment is recorded for January 13; there is no corresponding receipted bill. Judging from the bill we do have from the previous payment, this amount would correspond to 7200 "hard Bricks" at the price in Snyder's October bill. See Appendix C.

although unlikely that a lost drawings to which T. U. Walter alludes in an 1839 letter to Nicholas Biddle (see "Glazing" section below) would have given this information, since this sort of detail would likely have been left to craftsmen in the early nineteenth century. This is unlike the relationship between architect and contractor in the late twentieth century which relies on a large number of contract drawings. A lack of documentary instructions was even more likely in the construction of the graperies than contemporary jobs, as the masonry contractors were Walter's father and brother, and would have not needed this kind of formal direction from the architect.

Short of demolition, it is not possible to know the complete and exact configuration of the flue system within the walls, but a significant portion of it is visible on their exterior. On the northwest side of each, in each furnace house, is a pair of shallow, contiguous, brick arches (see figure 5) that served as the intake for heated air and accompanying smoke from the pair of coal furnaces contained in each house (see "Furnaces" section below). A significant portion of the main flue system is visible on the exterior of the walls. At the base of the southeastern wall, at the southwestern end, virtually the complete length of a flue can be seen (see figures 6 and 7, and diagram 1), as can others in both walls to a lesser degree, due to recent repair. The southwestern end flue extends from the closer arch in the furnace house to the end of the plastered section of the wall, approximately from the end of the wall. It can be assumed from visual evidence that a similar flue corresponds to each entry

arch in the furnace houses, although because of the vine growth on the southeast sides of the walls and modern portland concrete repairs, the whole system is not visible. The bricks were laid up in seven or eight courses, on their sides in order to provide maximum radiation, with an air space behind that would have enabled heat to rise up through the wall. The bricks were probably never plastered, but simply whitewashed, again to allow for maximum radiation, and also to reflect solar light and heat toward the plants in front of them. It is possible that these horizontal brick "radiators" comprised all of the brickwork flues in the walls, and that the hollow tile only supplied a chimney within the wall to vent smoke. This is supported by the lack of visible brickwork anywhere else on the exposed parts of the southeast sides of the walls, the intended destination for heat.¹³ If the chimneys were tile, and began at the end of the "radiators," then they would most likely have run vertically to the top of the wall from this point. The present condition of these "radiators" may pose a threat to the stability of the walls (see last chapter).

It is also possible that in addition to this "radiator" system, that underground flues conducted heat through the house, particularly toward the front where the vines were probably planted (see "Furnaces" section below).

¹³It should be noted, however, that according to contemporary sources cited in Chapter 1, greenhouse flues were constructed with one or more returns, and it is possible that this is also the case at Andalusia.

The question of the destination of the bricks other than those used in flues has one primary solution. The brick courses at the top of the southeast sides of the walls are probably original, with the probable exception of the parapet in the southeastern wall. This cannot, however, account for the total amount of brick used in the project. The most plausible destination for the brick intended for the project is a wall constructed at the base of the front, vertical glazing, in order that the sash not rest on grade where it would be exposed to more moisture and its consequent deterioration than if placed on a wall.

Although there is no record, either graphic or verbal, nor evidence above ground on site that indicates that a front wall existed,¹⁴ a strong case can be made for one having been constructed. First, it is extremely unlikely that the glazing sash and frames would have rested on grade, as this would have caused it to be subject to a great deal of rot from moisture infiltration, whether constructed in wood or iron (see below). All graphic sources of the period indicate that glazing, when not contained within the exterior walls as in the early orangery, was placed on some sort of base, either stone or brick.¹⁵ A persuasive contemporary source is the description

¹⁴The only image of the graperies known to exist, an engraving by Sherman Day discussed below, is insufficiently detailed to confirm or refute the existence of a front wall.

¹⁵See, for example, the contemporary prints compiled in May Woods and Arete Swartz Warren, *Glass Houses* (New York: Rizzoli, 1988), as well as their photographs of surviving early nineteenth century examples.

of a "hot-house" (forcing house) that appears in Robert Buist's revised edition of *The American Flower Garden Directory*, published in Philadelphia in 1839.¹⁶ In discussing the general dimensions of the greenhouse, he notes

the height in front six feet, including about three feet in brick basement, to support the front glass, which will be two and a half feet, allowing six inches for frame work.¹⁷

Further confirmation is provided by the figures included in the first American publication on greenhouses, Robert B. Leuchars's *A Practical Treatise on the Construction, Heating, and Ventilation of Hot-Houses*, initially published in 1850. Of the drawings in his book, only what he refers to as a "portable glass frame," a temporary, gabled structure with a small vertical base built of wood and glass, is shown built without a masonry base.¹⁸

Two contemporary documents provide strong evidence in favor of a front wall as part of the graperies at Andalusia, and in addition, of the placement of the vines relative to them. The first is a letter from Samuel Gridley Perkins responding to an inquiry about grapes from Nicholas Biddle, at the moment of the construction of the

¹⁶This book had originally been published in 1832, under the joint authorship of Buist and Thomas Hibbert. The revised edition "ran several editions and was long the recognized authority on flower growing" (U.P. Hedrick, *History of Horticulture in America to 1860*, 482).

¹⁷p. 145.

¹⁸Figure 11, p. 48.

graperies (see previous chapter). In discussing what he could provide Biddle in the way of plants, he said "I may, however, find some that are long enough to introduce through the wall from the front border."¹⁹ This suggests that Biddle had inquired about plants of a sufficient size in order to do this, particularly since the rest of the letter is a reply to a lost Biddle inquiry. A contemporary Philadelphia letter²⁰ describing the methods of growing grapes in a greenhouse, confirms this manner of cultivation and the existence of a front wall. In discussing a greenhouse in Germantown, the author notes that what

is certainly most desirable ... is to plant grape vines outside of the greenhouse and near the wall of it and introduce the grape vine through the wall (by means of a small hole though the wall) into the green house

and goes on later to say that "[this] has been tried by Nicholas Biddle, Mrs. Stott, Coleman Fisher and several others and found to succeed perfectly."

The strongest indication that the vines were planted outside of the house comes from the records of Craig (1823-1910), Nicholas Biddle's son.²¹ In February 1856,

¹⁹26th April 1835, Box 11, CBP. The use of the term "border" here refers to a prepared bed, which, in the case of grape growing under glass in the 1830s, could be either inside the front glass or outside.

²⁰J.J. Skerrett to Jane C. Skerrett, 15 February 1839, Society Collection, Historical Society of Pennsylvania.

²¹Garden Account Book 1854-1870, BPA. The information this account book provides will be discussed at length below.

in discussing the extreme severity of the winter, he noted that "there is a foot or two of snow on the vine borders."²²

The decision to create a formal garden within the walls after the removal of the glazing (see below) would have provided adequate reason for the removal of the front walls. Archaeological investigation would very likely yield evidence in the form of some portion of surviving foundations, since their complete removal would probably not have been deemed necessary. A slight change in the ground is still visible in the southwest quadrant of the formal garden (see figure 8), and a distinct compaction can be felt when walking over this area.

One of the most intriguing questions in regard to masonry is the original dimensions of the walls, raised by evidence of alterations to the walls (see next chapter). A surviving bill for a tinsmith's work may indicate their original length. Joseph and George Truman, who provided roofing for the furnace houses and gutters for the glazing (see "Ornament and Secondary Features" section), also furnished two separate 261' - 6" lengths of "lead plate Double width" for "Covering Battlement on forcing house" (see Appendix C). The most probable interpretation for these items is that this lead plate served as a coping on the walls above the top of the glazing, and that the term "Battlement" was used in reference to the section of the wall clear of the

²²"Remarks" section. Like all of the Biddle account books, this one is unpaginated; the "Remarks" appear at the back, and are transcribed in Appendix D.

glass and its support. That there are two identical items indicates that the top of the walls were of equal dimension, that is, that the present brick parapet in the southeasternmost wall is an alteration. If, as has been posited, the original length was probably about 265' - 6", the discrepancy between these two was likely accounted for by chimneys, with a small percentage of overage.

The original height of the walls is also uncertain, given evidence of possible alterations in pointing changes and differences in masonry structure within the walls themselves. This will be discussed further in the next chapter.

Glazing

As greenhouses, the graperies' most crucial component was the glass work that enclosed the south sides of the walls. Only one graphic image (figure 9) showing the grapery glazing on the masonry ranges is known to exist. This is an illustration from Sherman Day's *Historical Collections of the State of Pennsylvania*.²³ This engraving clearly shows the graperies to have been configured with lean-to glazing of the conventional sort. On the basis of the other views in the volume, it is reasonable to assume that Day's image was generally accurate, although it supplies little specific information, and thus cannot be relied upon for accuracy of detail beyond a general

²³(Philadelphia: George W. Gorton, 1843).

impression of the glazing's configuration. The graperies' apparent position and scale in Day's print should not be taken literally in photographic terms: it is clear from the rest of his work that his mastery of academic perspective and proportion was somewhat limited. Given these limitations, dimensions cannot be estimated with assurance.

In addition to Day's image, there is evidence of the former existence of lost or unlocated documents that might have specified the configuration of the sash and supporting structure. The first is a letter from T.U. Walter to Biddle dated four years after initial construction. Walter wrote:

The accompanying sketch of your Forcing houses is about the best I can make of it on so small a scale, and on writing paper. -- You wished me to make the drawing from the larger houses, but I can nowhere find a single note or sketch from which to get the dimensions of any except the two first that were built. -- If however you would prefer a sketch of those that were last erected I will go to Andalusia with the greatest pleasure and obtain the measurements necessary to enable me to make a drawing of these also.²⁴

Obviously, in addition to the indication of the existence of drawings of the greenhouses that are the subject of this study, both among Walter's office group as well as the sketch referred to here among Nicholas Biddle's papers, this letter indicates that *other*, smaller greenhouses were constructed at Andalusia between 1835 and 1839, and that Walter was likely involved with these (these will be discussed further

²⁴T. U. W. to N. B., 25 December 1839, Box 12, CBP.

in the next chapter). In addition, Walter's account books show that he had completed a drawing or drawings for the graperies by October, 22, 1834. No sketch or drawing such as those referred to here is known to survive, however, either among any of the Biddle papers or among the Walter records deposited at the Athenaeum of Philadelphia. That Walter only refers to measurements and drawings for the "first" houses, indicates that whatever greenhouses may have been built were clearly smaller and likely less significant than those for which the masonry does survive.

A group of insurance policies for the Franklin Fire Insurance Company²⁵ also indicates lost evidence. Biddle insured several, if not all of the major buildings at Andalusia in 1840. The surviving surveys are in numerical sequence beginning with 2699. They cover the main house, the stable, and the cottage. The only major building missing from the group is the grapery, as is survey number 2700. It is improbable that Biddle would have failed to insure the graperies, considering the significant capital investment he had made in them, and the amount of glasswork involved.

No receipted bill survives for the workmen for the sash and glazing, nor for the glazing raw material. The Andalusia account books do, however, provide important information, as does a receipt for work from a tinsmith that includes gutter work.

²⁵Collection Historical Society of Pennsylvania, Philadelphia.

Perhaps the most crucial question in regard to the sash and its supports is whether they were made of wood or cast iron, or some combination of the two, and what the profile of the glazing was overall. As discussed in the introduction, cast iron had been used in structural glazing in England as early as 1815, and Paxton and Burton's famous Conservatory at Chatsworth was built one year after the graperies, in 1836. Iron frame, curvilinear houses were not prevalent in this country, however, until a decade after the work at Andalusia,²⁶ and probably not truly popular until mid-century. While a significant amount of iron work was involved in the construction of the graperies, evidence indicates that this was not the only structural material used for the sash and its supports, as was to become prevalent later in the century. Further, there is no significant reason that Sherman Day's image should not be credited as reliable evidence for rectilinear, lean-to, rather than curvilinear sash.

The Andalusia account book records indicate that the primary material of the supporting structure for the sash was wood. There were several payments made for lumber. The first was made on June 2, 1835, to Charles Mercier for \$174.18 for "rafters." Additional payments, all listed only for "lumber," were made on July 20 to Samuel Thomas for \$300.81, April 11, 1836 to Herbert & Davis for \$344.87, and to Keyser & Longstreth on May 27 of the same year for \$173.84. Nicholas Biddle's

²⁶See Introduction. A curvilinear cold grapery was included in A.J. Downing's *The Horticulturist* in October, 1849. Woods and Warren, 141.

undated preliminary calculations for his grapery project, also in the Grapery and Mansion Account Book, include "Joists & c" and no item for cast iron structure. This indicates that at least his initial vision of his project did not include this relatively new technology.

As discussed in the first chapter, contemporary Philadelphia publications indicate that the most prevalent regional sash material was wood at the point when the graperies were built. Biddle, however, was not an average consumer of the construction trades, even though both Robert Buist and Bernard M'Mahon were likely writing for an audience of above-average wealth. Biddle's travels to Europe in early adulthood, his education and ongoing international contacts, as well as his social position all might indicate a desire to build in iron, following the latest European innovations.

And, although Biddle's initial vision was apparently for timber-frame glazing, a significant amount of ironwork did go into the graperies. As is the case for the lumber, however, no receipted bill survives for any of the ironwork supplied for the graperies other than for the coal furnaces.²⁷ The most significant expenditure

²⁷Considerable expense was made on an iron trellis to support the grape vines. See "Ornament and Secondary Features" section, below.

besides these was made on May, 1836,²⁸ to Edward Borolby for "iron mongery" for \$300.96. Also recorded in the account book are \$28.25 on October 5, 1835 for "iron work" and \$47.41 on April 6, 1836 for "sash irons" to Benjamin Barton. This last is interesting, especially in light of the recommendations in J. C. Loudon's *Greenhouse Companion*.²⁹ Biddle bought two of this important author's books in 1839,³⁰ and he may well have purchased or been familiar with Loudon's work relevant to the graperies project prior to its undertaking. In the *Greenhouse Companion*, Loudon, a great innovator in structural iron for these buildings (see Chapter 1), discusses construction materials:

but though we prefer iron green-houses, we are by no means against the use of wooden ones, which are erected at less expense, and more easily taken to pieces and replaced in case of large conservatories, indeed, where the roof is moveable, a mixture of timber and iron in the construction (as iron rafters and sash-bars, and timber styles and rails) is preferable to either alone.³¹

²⁸The date of this payment may not correspond to the period when the work was done. In the case of all major bills (see Appendix C) payment was made for materials and work supplied over several months, if not a year or more.

²⁹The second edition was published in London in 1825. Citation is from this volume.

³⁰"Loudon's Gardening" and "Plants," were purchased from Carey and Hart in June. A charge for binding "Loudon's Encycl. Gard." and "Loudon's Encycl. Agricult." more precisely identifies these. The bill is dated 31 December 1839, and covers the whole year. Box 24, CBP.

³¹p. 23.

The expense book records could be interpreted to indicate that the glazing at Andalusia was a variant on this: that is, that the rafters were timber, but that some portion of the sash could easily have been iron, particularly the vertical members inside the frame.

T.U. Walter's expertise in greenhouses and his acquaintance with Loudon's innovations is also relevant to the question of the material of the sash. Greenhouse design was never an important feature of his architectural practice, and according to Robert Ennis, Walter scholar, the graperies may well have been his only freestanding greenhouse project.³² Like most important and successful architects of the nineteenth century, Walter incorporated cast and wrought iron in his designs,³³ but is not known for exceptional innovation in the use of this material. He is known to have written to Loudon, but not on this subject,³⁴ and further, did not maintain a correspondence with the English garden author.³⁵ These facts further strengthen the

³²Telephone conversation with author, 1 August 1991.

³³Walter co-authored a pattern book for ornamental metalwork designs with John J. Smith, one of the founders of Laurel Hill Cemetery and Librarian at the Loganian Library. The book, *A Guide to Workers in Metals and Stone* was published by Carey and Hart in 1846.

³⁴See Sandra L. Tatman and Roger W. Moss, *Biographical Dictionary of Philadelphia Architects: 1700-1930* (Boston: G.K. Hall & Co., 1985), 822.

³⁵Telephone conversation with Robert Ennis, 1 August 1991. Most of Walter's correspondence is in the collection of the Athenaeum of Philadelphia, but was unavailable for examination at the time of writing because of renovation construction.

hypothesis that the principal structure supporting the sash was not iron. It should be noted, however, that because Philadelphia was an early center of American iron manufacture, it might well have been possible to create such an iron structure in the area of the city.

It is plausible that some of the unidentified iron may have been incorporated in a system for opening sash for ventilation to modify temperature and humidity. In earlier greenhouses, these adjustments were usually accomplished by the removal of sash. A sizable payment in the grapery and mansion house account book of \$160.99 on April 6, 1836 to John Exley for "screws and hinges" may in part correspond to such a system. If one were in place, it is most likely that the houses would have been vented near the bottom of the vertical glazing and the top of the shed glazing. In a later publication, this configuration is recommended for "ripening the wood of vines."³⁶

The single largest material expense of the graperies project was for glass, glazing, and painting the sash. Again, no receipt survives, but the account book shows an expenditure of \$707.25 to "Wilson" for glass on November 25, 1835 and of \$1,535.79 to "Jones and Mayer" on January 8, 1836 for painting and glazing.³⁷ Just

³⁶George E. Woodward, *Graperies and Horticultural Buildings* (New York: George E. Woodward, 1865), 38.

³⁷In the back of Biddle's book, in the running accounts, he notes this payment as for "glazing and glass."

as with the dimensions of the overall sash, there is no evidence for the size of the panes of glass used in them at the time of construction. The garden account book of Craig Biddle,³⁸ Nicholas Biddle's son, extensively records activities in the grapery. There are several expenses noted for repairs of glass using 6" x 7-1/2" panes. This may well indicate the size of glass originally used in the graperies.

A possible indication of the glazing's overall length, and confirmation that it was built in lean-to form, exists in the tinwork bill from Joseph and George Truman discussed above in relation to the masonry. There are two separate entries, one from August 22 and one from December 5 in 1835 for 250 feet of hanging gutter (see Appendix C). Gutter was common in greenhouses, particularly graperies and other lean-to forcing houses, and was placed at the point where the vertical sash met the angled, in order to divert rain run-off. If the grape vines were rooted outside the houses, as described in the Skerrett letter quoted above, then this would have been particularly important in order to prevent soaking. It is probable that this dimension of 250 feet represents the length of the original glazing.

The height of the front glazing, and angle and span of the lean-to is a matter of conjecture. A possible indication of the height of the front glass comes from the section of Buist's *American Flower Garden Directory* quoted above, which gives this

³⁸This account book is in the BPA, and covers the years 1854-1870. Its evidence will be discussed further below.

as "six feet". Buist's dimension has potential relevance to the graperies because he lists the "height, at back from twelve to eighteen feet."³⁹ This is in keeping with the graperies' masonry, which stands approximately fifteen feet, with the exception of the central parapet in the southeast wall (most likely a 1915 alteration, see below). He also gives that "the medium width is from twelve to sixteen feet"

The means whereby the glazing system was attached to the wall is unknown. It is possible that joists were let into the wall by means of pockets. This would argue that the brickwork on the southeast sides is original and explain its use, since it is easier to create pockets at regular intervals with brick than with stone. The stucco repair above the line of the plaster could relate to the removal of flashing at the juncture of the wall and glazing, or the filling-in of pockets. Careful investigation in this area could yield more information in this regard.

Furnaces

A detailed, receipted bill from Stephen P. Morris & Co.⁴⁰ for fixtures for the graperies' furnaces survives in the Craig-Biddle Papers (see Appendix C). This document shows sixteen sets of items bought for the project, in other words, two

³⁹p. 145.

⁴⁰This firm was later to become the large and important Philadelphia Tasker & Morris Iron Works.

furnaces were placed in each house, one for each brick arch discussed above. The items on the Morris Company bill consist of, per furnace, a door and frame with latch, one wrought and one cast bearer for nine bars on which to burn the coal, and two wrought bars to support the bearers. In addition, each furnace had two dampers, one with a regulating rod and one without.

Conspicuously absent from this bill is any item that could be interpreted as the walls of a firebox. Eastern Pennsylvania had been a colonial center of cast iron stoves from the early eighteenth century, from the German five-plate jamb stove to Benjamin Franklin's "Pennsylvania Fireplace." Thus, it would be possible for the graperies to have been outfitted with stoves with iron fireboxes. The Morris bill also includes "Backs & Jambs" for the mansion house, so it is unlikely that if there had been iron fireboxes for the furnaces, that they would have been supplied by another merchant.

It is most likely, rather, that the firebox was constructed of brick. This is the material described for this purpose by Robert Buist in his *American Flower Garden Directory*, and the traditional oven construction material. It is not known if there were two fireboxes per house, or one with two doors in each. The configuration of the fireboxes and the manner by which they were connected to the flue system is unknown, as is whether they were connected to any underground piping in the houses. The history of early American heating technology has received scant scholarly attention, and there is a clear opportunity for further research in this area.

Without more general knowledge, however, hypotheses about the furnaces at Andalusia are thwarted. Archaeology inside the furnace houses could well yield information about the fireboxes. It is quite possible, for instance, that some portion of the firebox was built below the present grade level, and evidence of this could still exist.

Ornament and Secondary Fixtures

There is little indication about original ornament for the graperies. The walls today are embellished only by the masonry structure itself: the coursing and smooth surface of the stone on the northeast sides. A nineteenth century grapery, as a more utilitarian structure, was less likely to be ornamented than a conservatory built to shelter a collection of tender exotics whose display was largely an aesthetic experience. Additionally, ornament was in general less common in greenhouses in the 1830s than later in the century, particularly in this country. The Truman tinsmith bill discussed above in regard to the length of the walls is the most intriguing record in this regard. If the reference to a "Battlement" in their bill corresponded to twentieth century usage, then, like the grotto, the graperies would also have been stylistically Gothic. While there is precedent for "vineries" in this manner from no less a designer than J.

C. Loudon,⁴¹ this possibility makes an explanation for the lead plate dimension more problematic. Additionally, the Sherman Day engraving discussed above (figure 9) shows no indication of a crenelated parapet (what in modern usage would be called a battlement). Given the lack of detail in this print, it is possible that one could have existed. A contemporary grapery, whose masonry is still standing, built by George Sheaff at the Highlands near Fort Washington, Pennsylvania, also outside of Philadelphia, was embellished with crenelation after the Loudon design.⁴² Photographs in the Biddle papers at Andalusia from the late nineteenth century, however, show no such decorative construction. It is quite probable that the term "battlement" indicated the portion of the masonry which stood above the top of the glazing. The primary ornament of the graperies was most likely what it is today, the simple form and color of the masonry itself. As discussed above, the glazing was most likely also unornamented both in the sense of its overall form and the question of the addition of decorative wood trim or metalwork.

Both surviving elements and the construction records do provide information on the subject of secondary features, particularly stone trim, which Biddle obtained

⁴¹See Stefan Koppelkamm, *Glasshouses and Winter Gardens of the Nineteenth Century*, Kathrine Talbot, trans. (New York: Rizzoli, 1981), 19.

⁴²I am grateful for this information to Sandra Mackenzie Lloyd, currently Curator of Education at Cliveden in Philadelphia.

from the prominent supplier John Struthers⁴³ who had provided the material for the Second Bank, and who ran the largest stone yard in Philadelphia. Struthers furnished sixteen marble copings for the chimneys, clearly corresponding to a flue emerging from each furnace arch described above. These, now gone, may have been similar to the chimney caps that survive on the main house today: simple, rectilinear slabs resting on brick supports. Struthers gave a total of 196 feet for all sixteen. This gives 12.25 feet each. It is probable this corresponds to a dimension of running feet; thus making it possible, for example, for each chimney cap to have measured roughly 3' x 4', although this is a matter of pure conjecture. In addition to the chimney copings, Struthers furnished five blue marble "platforms" and sinks, perhaps each set as a unit, although the destination for all these is also unknown. He also provided two each of "hydrant" and "spoutstones," specified simply as "white"; presumably one set each per grapery range. Again, the specific destination is unknown. It is interesting to note that finished stone steps survive on the northwest side of the southeast wall, at the opening to the enclosed garden. It may be that these were some of Struthers's "platforms," either in their original location or moved there subsequently, or that they are later additions. With this one potential exception, none of the other stonework is known to survive.

⁴³See Appendix C for transcription of Struthers's receipted bill.

The Truman bill provides several other details about the graperies in addition to the probable length of the glazing discussed above. First, that the roofing on the furnace houses was originally turned, standing seam tin, as is still the case on most of the furnace houses today. The exception is the house that now encloses the pump for the pool on the southwest of the graperies enclosure, which has been re-roofed in slate. Truman also supplied gutter for the furnace houses, and a considerable amount of pipe whose destination is known, some of which may have been downspout, and the rest presumably for conducting water. The destination for the lead plate not designated for the "Battlement," a total of nearly 300 feet, is also unknown. Finally, Truman furnished two lightning rods, presumably one per range.

One of the larger expenses in the graperies' construction was for a wire trellis, with a total of \$727.74 to T.P. Wickersham. He was also paid \$633.44 for "posts & wire & c." in connection with the trellis, described as "arched."⁴⁴ It is not known how this trellis was placed within the houses, although it was common practice later in the century to train vines both along the underside of the glass and up the rear wall, as several sources show, and this is the most probable configuration for the trellis. It is also possible that part of the trellis was placed vertically on the rear, masonry walls.

⁴⁴The payments were made near the end of the project, on June 4, and August 1, 1836, respectively.

Little is known about the original wood trim involved in the construction of the graperies. It is likely, however, that the simple frame in the doorway of the northwest wall is original, or replacement in the original manner. The pintels that survive on the frame are also likely original. The wood doors for this opening survived at least into the 1890s, when they were photographed by Charles and Letitia Biddle (see figure 10). It is not known how much of the trim in the furnaces houses is original. Paint analysis could provide important information in this regard (see final chapter).

The Working Graperies

In addition to the details provided by Biddle's correspondence with the members of the Perkins family about the vines brought for the graperies, the Andalusia account records provide information about the working of the graperies both during the rest of Nicholas Biddle's life and during the tenure of his son Craig at Andalusia. Nicholas Biddle's records contain information pertinent to the graperies until around 1841. Fortunately for the graperies, Judge Craig Biddle, like his father, was avidly interested in agricultural matters. He was a member of the Farmers' Club, an organization allied with the Philadelphia Society for Promoting Agriculture, and at times served as the Club's president. His particular interest was the breeding of Guernsey cattle, but he also continued to both raise and sell grapes

from the graperies. A garden account book that spans the period between 1854 and 1870⁴⁵ gives the most information about the operation of the graperies and their yield of any source. Of particular interest is a narrative section of "Remarks" that appears at the back of the account book (see Appendix D).

As discussed above, the strongest evidence for the configuration of the vines is for them to have been planted outside of the front wall, and suspended under the shed glazing by means an arched, iron trellis, to which they were attached by twine. In addition, there may have been a second group of vines planted up the masonry wall.

The correspondence discussed above in regard to the perceived healthful properties of grapes indicate that fruit was being solicited from Andalusia by September, 1836.⁴⁶ Whether these grapes necessarily came from the graperies, as Nicholas Wainwright asserts⁴⁷ cannot be verified, since this would have been the season in which field-raised vines would have yielded as well. It is reasonable to assume, however, that the vines Biddle had procured from Boston would have produced fruit by this point. His records do indicate that he exhibited a potted grape

⁴⁵BPA. All following references to Craig Biddle's records are to this unpaginated volume unless otherwise noted.

⁴⁶W. H. Delancey to N.B., 10 September 1836, Box 11, CBP.

⁴⁷Wainwright, 37.

vine in June, 1837 at the Athenaeum of Philadelphia.⁴⁸

There is documentary evidence about the first revenue from the sale of grapes at Andalusia. Whether this came exclusively from those raised in the graperies, from remnants of the vineyard,⁴⁹ or from a combination is not recorded. In December, 1838, Nicholas Biddle recorded the sale of 66 pounds of grapes.⁵⁰ By 1840, the yield had increased to at least 179 pounds, sold at a price of \$1.00 per pound. There is no known surviving record of the graperies' yield beyond this date during the remainder of Nicholas Biddle's lifetime.

Craig Biddle's records give a sense of the graperies' yield over a greater length of time, and he continued to sell grapes through to the end of his surviving garden accounts, 1870, along with other types of fruit.⁵¹ Craig Biddle noted with satisfaction that in 1855, at the apparent outset of his "turn" at the graperies, that he had a credit of \$161.05 beyond his expenses.⁵² At an initial investment of over

⁴⁸ Andalusia accounts, Box 29, CBP. The pot was accompanied by "two porters."

⁴⁹ The 1842 Andalusia Day Book gives an expense of \$1.50 on May 7th for the "sitting of fence in vinyard [sic]," indicating its survival.

⁵⁰ *ibid.*

⁵¹ Again, the question of whether grape revenue recorded corresponds exclusively to the graperies production, or yield from other Andalusia sources, possibly including the greenhouses built in 1838 (see next chapter), is unresolved.

⁵² "Remarks" section, Garden Account Book.

\$21,000, however, neither Biddle ever turned a significant profit on the graperies. The recorded yield under Craig Biddle varies widely from a maximum of over 480 pounds in 1854 to lows of 50 and 58 pounds in 1860 and 1861, respectively, perhaps in connection with the war. Sometimes revenue was recorded rather than the quantity of grapes harvested, and breakdowns for grapes are missing altogether from some years.

There is no record of Nicholas Biddle's schedule for forcing the vines, although coal was supplied for the graperies as early as January, 1836.⁵³ It is not known what quantity this initial payment represents. Neither Biddle kept an accounting of the total consumption of coal during the operation of the graperies. The closest sense of this consumption can be gleaned from Craig Biddle's notation of the purchase of fifteen tons of coal in February, 1859. Craig Biddle noted in mid-February of 1855, 1856, and 1857 that he started forcing in the graperies at that point,⁵⁴ although these were the only three years in which he recorded this event.

The account records provide interesting information about the cultivation of the vines in the graperies, for instance that the pesticide of choice for Nicholas Biddle was tobacco. There are multiple instances of the houses being fumigated, presumably

⁵³Supplied by "Downing & Wood." Grapery and Mansion Account Book, BPA. See O'Neill, 81.

⁵⁴"Remarks" section.

as insects were detected. The amount used at any one time varied, from four pounds to ten.⁵⁵ "6 lbs of soap" may also have been used to fight insects. The purpose of other small expenditures for the grapery is clear, including a thermometer and "flower pots,"⁵⁶ as well as a pair of "grape scizars [sic]"⁵⁷ and twine, while some are more mysterious, such as "candles for use of vinery."

Among the initial expenses for the grapery was bone dust. Along with the fertilizer this represented, large quantities of "street dirt" were brought in during the construction of the graperies.⁵⁸ This was not, as might be supposed, soil appropriate for road construction, but rather the collected refuse from urban streets. This would have been composed largely of horse and other animal manure and food waste. Clearly a rich source of organic nutrients, this was likely a fairly unpleasant material to be around until it had rotted sufficiently to reduce its odor. Craig Biddle recorded that he also used bone dust, as well as manure. In the winter of 1857, he remarked that he manured the "border" at the same time as he began forcing. Since the vine roots were probably outside of the heated house, the manure used may have been

⁵⁵ Andalusia account records, Box 29, CBP.

⁵⁶ Payment on January 16th, 1836 to John Smith in Nicholas Biddle Account Book January 1834-February 1836, BPA.

⁵⁷ Bought in 1838, Andalusia Accounts, Box 29, CBP.

⁵⁸ See O'Neill, 80-81.

fresh and produced heat. Biddle's use of the term "border" was consistent with contemporary usage for the bed in which the grapes were planted.

Craig Biddle's records reflect the necessity for repeated, annual glass replacement for damage to the sash. While he does not note expenditures for regular whitewashing or painting, he recorded on one occasion that "the entire front range was painted lead color by Frederick,"⁵⁹ and also gives a formula of "1/2 bushel of lime" to "20 pounds of tallow" as a "substitute for paint" that "Mr. Sherwood says he white washes all his vineries with."⁶⁰ This treatment could have been used as a shading compound of the glass. In November, 1859, he undertook major revitalization project in the grape borders:

we commenced digging up the border of one half of the back range and taking up all the vines. I've dug to the bottom of the border, about 3 ft in width from the wall, then filled in about 3 inches of shore gravel on top of the old sod & the dirt dug out mixed together. We found scarcely any fibrous roots and the main roots two to three feet from the surface.

After finishing the above we commenced on the other half of the back range & finished it in the same manner. The vines are put back & almost all the old wood buried.

The following May 22, he "got from John Lurac [?] 24 Grape vines raised by Ferguson - 2 years old to plant in back grapery."⁶¹

⁵⁹February 18th, 1856.

⁶⁰May, 1862.

⁶¹See Appendix for list of varieties bought.

Biddle's final notation in his "remarks" is dated April 5, 1863: "all pot vines & forced vines destroyed by fire." Despite this remarkable statement, the account records for the same year show sales for over 100 pounds of grapes, and in 1869, a remarkable 394 pounds were produced.

While the 1863 fire apparently had a sufficiently discouraging affect on Craig Biddle to cause him to cease to register his activities in connection with the graperies, the records of the Farmer's Club⁶² testify to the survival of vines and glazing as late as 1871. In the report of a dinner held at Andalusia on June 15th (in which the guests arrived by steam ship), the graperies were particularly noted:

on our usual tour of inspection we visited the graperies, filled with healthy vines, and the promise of a large yield of fruit. They were in most excellent order, as well as the garden adjoining⁶³

This is the last known written notice of the graperies' operation as such.

Mention of the graperies is absent from the report of the July 1887 visit of the Farmers' Club to Andalusia,⁶⁴ as it is from other contemporary descriptions of Andalusia. This is particularly conspicuous in several written accounts of Sidney George Fisher, the well-known Philadelphia diarist, on the occasion of two visits in

⁶² *Minutes of the Farmer's Club of Pennsylvania, A Record of Seventy Years - 1849-1919* (Philadelphia: J. B. Lippincott Co., 1920).

⁶³ *Minutes of the Farmers' Club*, 129.

⁶⁴ *Minutes of the Farmers' Club*, 182.

1859 and 1860 to Andalusia for dinner meetings of the Farmers' Club.⁶⁵ Craig Biddle was the host at the first and both Craig and Charles Biddle (another of Nicholas's sons) were present at this second meeting. Fisher remarks on both houses, the lawn, and the woods, and makes general reference to the farm, but his failure to describe the graperies is salient. This is particularly so in light of his inclusion of descriptions of both ornamental hot houses in general and graperies in specific on his visits to country houses in the Philadelphia area.⁶⁶ Why Fisher should have failed to note the existence of the graperies is unknown, but is cause for speculation. It is possible that, despite their scale, they were not considerably larger than contemporary greenhouses. Given the enormous changes in greenhouse form as the nineteenth century progressed, it may be that the Andalusia graperies were considered too old fashioned to be remarked, like Fisher's dismissal of the Greek Revival style of the house as "unfit for a dwelling, especially for the country."⁶⁷ Perhaps, because the Andalusia graperies, despite their size and the capital expenditure entailed in their construction, were not an ostentatious and ornamented display of capital consumption, Fisher found them unremarkable. The only other known published

⁶⁵Nicholas B. Wainwright, ed., *A Philadelphia Perspective: The Diary of Sidney George Fisher Covering the Years 1834-1871* (Philadelphia: The Historical Society of Pennsylvania, 1967), 337-8; 362.

⁶⁶For example, his description of a visit to Wodenethe, 254.

⁶⁷p. 337.

notice of the graperies, in Sherman Day's *Historical Recollections...* (see above) simply notes their existence.⁶⁸

⁶⁸Day, 151.

CHAPTER 4

AFTER THE GRAPES: MAJOR CHANGES TO THE GRAPERIES

The first major structural changes to the graperies were begun around 1838, the year before Biddle retired to Andalusia. Nicholas Wainwright, working from unidentified sources, notes in *Andalusia* that in this year "the cottage took form" and that construction took place "from January through December"¹ including work on the "vineries."² A September, 1838 letter to Biddle from Frederick Graff,³ the designer/engineer of the Fairmount Waterworks in Philadelphia (which produced the first truly reliable source of fresh water for the city and considered one of the greatest wonders of its times), indicates the nature of the bulk of the work on the graperies at this point. Graff begins his letter saying that he and Biddle had discussed the "subject of raising water," and that Graff has looked into "windmills" which he judges unreliable, "steam engine" power which he faults for the "expences of the fuel and the hire of a person acquainted with that kind of machinery so subject to corrosion and

¹Wainwright, 25.

²Wainwright, 26.

³Box 11, CBP.

decay when not in use."⁴ Graff ultimately recommends a horse-powered mill, and a design by his "friend Mr. Fredk. Erdman" for one. Nicholas Wainwright, however, notes that "a reservoir, steam engine, and iron piping for the irrigation of the fields were installed in 1839, when an engineer spent four weeks boarding with the gardener."⁵ This cannot be substantially confirmed from either the Biddle papers at the Historical Society of Pennsylvania examined for this thesis, or the account books which remain at Andalusia, but a receipted bill to Jacob Lodge, dated September, 1841,⁶ records a total of \$216.50 expended on pump machinery, including "patent gauge cocks." Wainwright clearly indicates that this water system was not exclusively intended for the use of the graperies, which seems plausible. The water tower structure (referred to in family photographs as the "reservoir house"), stood at the extreme north corner of the grapery complex, and survived into the age of photography (see figure 11). It was largely destroyed in a fire in the winter of 1914-1915 (see figure 12). A plate published in Louise Shelton's *Beautiful Gardens in America*⁷ of the garden placed within the grapery walls after the demise of the glazing

⁴Graff is perhaps referring to, and certainly remembering these very problems that doomed the first Philadelphia Center Square Waterworks designed by Benjamin Henry Latrobe.

⁵Wainwright, p. 26.

⁶Box 25, CBP.

⁷ 1st. ed. (New York: Charles Scribner's Sons, 1915).

also shows the water tower.

A letter from T. U. Walter to Biddle from December of 1839 indicates a additional possibility for the 1838 campaign of construction referred to by Nicholas Wainwright. Walter, like Graff, responded to a request from Biddle,⁸ in this case for a drawing of the "forcing houses." Walter indicates his willingness to travel to Andalusia to make measurements for a sketch of "those that were last erected," distinct from the "larger ... two first that were built." How many of these "later" houses were completed, what the details of their construction were, and their location unfortunately all remain unknown.

There are no known alterations which took place during the majority of Craig Biddle's tenure at Andalusia. The most extensive alterations to the graperies, comprising the removal of their glazing late in the nineteenth century and the subsequent creation of a formal garden within their walls, may not have been at his behest, since he had made no other major changes there. The date when the glazing was removed, and exactly who made the decision to remove it and install the formal garden, however, is unknown. The last known documentation of the functioning graperies is in 1871, as noted in the previous chapter. Nicholas Wainwright, working from sources not located for this study, says that

⁸This request is now lost, and with it Biddle's motivation in the matter.

subsequently severe storm damage to the hothouse glass brought the culture of indoor grapes at Andalusia to a close. All was cleared away except for the two massive ranges of high walls⁹

When exactly this occurred, however, is unknown.

Similarly, it is not known exactly when the formal garden between the walls was first put in. It is probable, however, that this was done during the last decade of the nineteenth century. A view taken in 1893, and one in 1895 (figures 13 and 14) shows quite small boxwoods, apparently relatively recently planted. In 1888, Charles Biddle brought his new bride Letitia Glenn Biddle to Andalusia from the Baltimore area. From the Biddle family photograph scrapbooks from this period, this garden seems to have been her precinct. There are no photographs of Andalusia known to survive which predate her tenure there, and none in the Biddle family collection are earlier. The earliest photographs of the graperies area were taken in the mid-1890s, and show her, her family and friends. From these a sequence of events can be deduced from this point on, and some conclusions can be drawn about events before to the 1890s.

The early photographs show the graperies walls' masonry much as it appears today. The white-wash and/or plaster whose remains are on the walls to the present are clearly visible. Several brick courses are just visible at the top of the southeast

⁹Wainwright, 38.

sides of the wall (see figure 11) as they still are today in winter (see figures 4 and 6). A lattice covers the southeast sides of both walls (see figures 11, 12, 14, and 15). The ghost of this lattice are today still clearly visible on the walls in the form of vertical seams now filled with cementitious patching material (see figures 4, 16). It is not known precisely when the lattice was removed, but it was gone by the 1940s.¹⁰ It was probably taken out around 1933, when other changes were made to the garden. Because patching was necessary after its removal, it is possible that the lattice was original to the 1835 construction, or at whatever point the walls were plastered. Losses in the plaster of the northwest wall support this.

The formal garden within the graperies' walls is directly related to the one there now (figure 17). The boxwood appears to be in the same position, forming two axial paths at right angles to each other (see figures 13, 14, and 18). The two southwest quadrants were filled with planting beds (see figure 19). These were replaced by turf by 1933 (see figure 20).

Prior to the period when these early photographs were taken, however, several alterations were made to the graperies' masonry, although the extent of these is unknown. The furnace chimneys were removed, and the concrete coping which tops the walls may have been placed there concurrent with this removal. It is unclear if the

¹⁰Slide photographs made by Morris E. Leeds, collection of the author.

brick parapet that marks the entrance in the southeast wall was constructed at this time, was original, or part of the Mellor and Meigs work, although stylistically, the best case could be made for this last. This feature conforms to the manner of the firm, which in this derives from the work of Sir Edwin Lutyens. The only early photograph that shows the masonry of this section of the walls (figure 21) is undated, but most likely was taken after 1915. This hypothesis is based on the conclusion that the concrete pergola and steel lintel shown (both survive *in situ*) in the central doorway of the southeast wall are part of the Mellor and Meigs alterations because of their style and material. This chronological conclusion is supported by an earlier, 1890s photograph (figure 22) that shows a picket fence on the southeast side of the southeast wall, and no pergola.

The vines visible in the 1890s photographs (see figure 10, 11, and 13) had clearly been there for some time, since they were mature plants at this time. By the 1930s, the vines on the north side of the doorway in the northwest wall was "at least a foot in diameter" and are identified as wisteria (see figure 23). The first wisteria was presumably planted at the time of the removal of the graperies' glazing, whenever that occurred.

Photographs taken between the 1890s and the 1930s (see figures 11, 20, and 24) show a group of cold frames and a hot bed with a chimney in the northern quadrant of the formal garden. The concrete frames of the northeasternmost set of

these remain on site today (see figure 17). Because of their position, these must have all been built after the demolition of the graperies' glazing, perhaps to serve the new, formal garden or to supplant the graperies in forcing other plants. Their concrete material, with large pebble aggregate, matches the coping on the top of the walls, on the basis of visual inspection. It is therefore logical to conclude that the addition of the coping and the construction of the cold frames were probably concurrent. The larger cold frames (seen in the foreground of figure 11) were still in place in the 1940s, but have since been removed. The large hot bed, however, was gone by that point.¹¹

The most extensive architectural alterations to affect the graperies comprise the work of the firm of Mellor and Meigs in 1915. Because of a fire in January, 1915, the water tower (reservoir house) at the north corner of the graperies was heavily damaged (see figure 12). Starting in the spring of the same year, a cottage was built in the familiar style of the firm (see figure 24). In addition to the construction of this new building,¹² called the "chauffeur's cottage" in the family scrapbooks, alterations were made to the adjacent coach house, and to the masonry at the northeast ends of both grapery walls. A section at the northeasternmost end of each wall, approximately fourteen feet wide, (see figures 25 and 26) is of different construction than the rest of the walls. Also of rubble schist and brick, the stone is cut smaller here

¹¹Morris E. Leeds slide photographs.

¹²Several blueprints for the project survive in BPA.

than in the rest of the walls, and is interrupted at regular intervals by stretcher courses of salmon brick. This masonry matches that of the stable/garage wall and the cottage built by Mellor and Meigs (see figure 24) and was probably part of this construction. As figure 11 indicates, this fourteen foot section was higher than the bulk of the wall in 1895. The construction of the gazebo on the cottage and the changes to the wall in the garage/coach house would have necessitated rebuilding to a certain extent. Whether the higher, fourteen foot section visible in the 1895 photograph was part of the 1838 construction of the water tower (reservoir house) is not known.

Further, it is probable that the pergola which fronts the entrance to the formal garden on the southeast was built in conjunction with the Mellor and Meigs work, as noted above. The pergola appears in a small photograph dated 1915 (figure 21), but could possibly have been built earlier. As noted above, it would make most sense stylistically for this later pergola to have been part of the Mellor and Meigs work, but no documentation has been located to support this. Plate 177 in Louise Shelton's *Beautiful Gardens in America*¹³ shows another pergola in the same position, made of frame. As also discussed above, the steel lintel presently in place in the central doorway in the southeast wall was probably put in by Mellor and Meigs as well, and could argue for their addition of the brick parapet in the same wall.

¹³2nd ed. (New York: Charles Scribner's Sons, 1924).

By 1933, most of the quadrant areas of the interior garden had been changed from planting beds to lawn, as they substantially remain to the present (see figure 20). The marble tub on site today had been installed by this point, in the location of a hand pump seen in earlier photographs (see figure 11, extreme left margin, and figure 13). This tub was originally installed in the bath house to the rear (northwest) of the main, mansion house, and a bill for purchase survives among the Biddle papers.

Since 1933, most of the changes have been relatively minor, and have consisted primarily of changes in plant material.

CONCLUSION: PRESERVATION RECOMMENDATIONS AND EVALUATION OF HISTORICAL SIGNIFICANCE

Preservation Recommendations

While the graperies of Andalusia no longer exist as such, their massive masonry comprises a persistently important feature of the landscape there. Their role within the formal garden they enclose is that of crucial definition of space, with the decorative addition of their elegant and massive stonework. They also provide shelter and climactic moderation that has provided a hospitable environment for the enclosed boxwood, which in unsheltered locations does not thrive in Pennsylvania. Thus, the masonry continues to perform at least part of the role for which the graperies were originally intended.

This thesis has presented a thorough examination of the surviving documentation connected with the Graperies during their working life, has touched on many of the salient features of the context which affected their construction and operation, and has made some preliminary material observations. In terms of a full historic study, a much greater understanding of the graperies, and the best hopes for the future use and survival of their structure, a whole additional area of investigation must be undertaken. Specifically, a full program of material investigation, analysis, and documentation is strongly called for. In addition to providing necessary

information for the physical survival of the remains of the original graperies, material analysis, if carried out carefully by informed participants, will aid in developing a strategy not only for the survival of the graperies but also for their continuing successful integration into the ongoing development of the Andalusia landscape.

The first recommendation is for a complete program of documentation. While the graperies have been documented by H.A.B.S., as noted above, the drawings have several problems, including the lack of differentiation between the Mellor and Meigs work and the original graperies masonry, the implication on the isometric plan that the structure is symmetrical, and the failure to note individual differences in the furnace houses.

Second, connected to the first, a full battery of material analysis is strongly recommended. Both paint analysis and extensive mortar analysis would be invaluable. Relatively superficial examination of the differences in mortar indicate many repairs and replacements, on both sides of the walls. A greater understanding of the extent of the changes made after the removal of the glazing in the creation of the parterre garden, as well as in the Mellor and Meigs work, would be the most likely result of this analysis. Careful probing of the walls could reveal the full extent of the brick "radiator" system and more of the flue system. Examination at the base of the brick parapet may reveal the means of attaching the glazing structure, for example joist pockets or some remnants of flashing. By comparing mortar samples from

throughout the walls, mortar analysis here could determine if the brick is original, late nineteenth century, or part of the Mellor and Meigs work.

It may also be possible to determine both original paint color and the Mellor and Meigs color on the timber. Two potential problems to watch for in paint analysis are, first, the possibility that in the original construction of the furnace house doors, windows, and trim recycled lumber from earlier constructions may have been used, and second, it is certain that some woodwork has been replaced over the years. It is even possible, although relatively unlikely, that Mellor and Meigs may have used recycled lumber in their work, as their Philadelphia contemporaries are known to have done in other "restorations." While instances of this practice have not been documented in this firm's work, R. Brognard Okie and G. Edwin Brumbaugh, for example, are known to have done this, but usually in the case of interior woodwork. Given that the graperies no longer exist as such, and that they are now part of a different designed landscape that is strongly connected to the work of a major American architectural firm, restoration of paint color to the era of the Mellor and Meigs work would be the most appropriate choice, if restoration were chosen. However, restoration to a Mellor and Meigs color should only be considered if it can be very securely determined. Additional research on their other work to form a basis of comparison is strongly recommended.

The third, and probably most fruitful avenue of recommended investigation

is archaeology. Because of the disturbance of the soil from both the construction of the hotbeds at the northeast end of the northwest wall and of the swimming pool on the river side of the southeast wall, the other ends of both walls on the former glazing sides should prove the most informative sites to run trenches. As noted above, archaeology may confirm or refute the location and existence of the front base walls for the glazing, and those of any underground heating pipes. The site of the grape borders may also be discernible from a change in soil. There may also be remains of internal walks, the irrigation system, stone trim, and even underground flues or internal hot-beds. The second principal recommendation for excavation is the interior of the furnace houses. Digging there should provide information about the configuration of the original fire boxes.

There are two principal areas of condition problems which I have observed in the course of this study. First, the present practice of patching the brick "radiators" with portland cement discussed above not only obscures their position but fails to correct the source of the problem the repairs are intended to solve. The present difficulty is the deterioration of the brick due to moisture build-up. Given the position of the brick at the base of the walls, and the airspace behind them to allow for the former passage of heated air, their structural role may well be important. Because brick as a building material is inherently susceptible to moisture damage, and this deterioration seems to be relatively new problem, the source of the moisture

infiltration problem needs to be addressed. The application of a thin layer of patching on their exterior both seals in the moisture that is causing the deterioration, and will not provide enough structural stability in the event that the brick fails. The cause of the moisture build-up in this area, which seems to have increased in the last few years, and the structural role of the brick should be determined by a structural engineer familiar with historic buildings and structures as soon as possible. It may be necessary to fill in the air spaces behind the bricks to accomplish stabilization. If this is necessary, an infill material compatible with the drainage requirements of the walls, but clearly different from the original structure, should be used. As much of the original brick should be saved *in situ* as feasible; this brick is invaluable evidence of the original functioning of the graperies. If Andalusia continues in its present direction as a more public site, then a display area in the wall of one of the "radiators," in stabilized condition, would provide an excellent opportunity for public education.

The second potential problem area is the vines that presently cover the walls. These consist of both evergreen and deciduous species, most notably ivy and wisteria. Vines cause a number of potential problems. First, because they obscure the condition of the wall, problem areas are more easily missed, and regular monitoring is difficult at best. In the areas where wisteria is present, this can be accomplished to a certain extent when the leaves are not on the vines, but there is no point when this

can undertaken in the areas covered by ivy. Vines also retain moisture in the wall more than if they were not present.

The solution to this second problem is more difficult. Because the vines are a significant feature of the present grapery garden, and have been a part of this garden since at least its creation in the end of the nineteenth century, their complete removal would be both unfortunate and undesirable. In addition, they serve as a kind of echo of "the vine" for which the walls were originally constructed. The most practical solution would be the construction of a trellis to support the vines, beyond the remnants of the present trellis on the southeast sides of the walls. This trellis should be constructed in such a way that it could be moved away from the face of the walls to both monitor their condition and effect necessary repairs. It should be attached to the walls in as minimally intrusive a manner as possible.

Finally, while this study has researched the working life of the graperies in depth, more research is yet to be done, particularly on the later formal garden and on the Mellor and Meigs work. Because of the firm's national importance in the early part of this century, this project should prove fruitful. Within the field of historic preservation, this type of commission could enlighten an earlier era's approach to historic fabric. No doubt the work of this earlier generation has lessons for modern preservationists, not only in respect to the ethics and practices of earlier practitioners, but also to provide insight into our own methods and beliefs.

The Graperies' Historical Significance

Built as a means to rather than as an end in themselves, and of generally fragile construction materials, there are very few survivors among early American greenhouses. While the graperies' walls are not the sole remains of this early technology, they are a crucial testament to the largely forgotten interests of an important era in American history, and very important and rare survivors of national scope. Of the great "requisite" Philadelphia greenhouses of the late eighteenth and early nineteenth century, few remain. In addition, the original graperies represented the bulk of Nicholas Biddle's capital expenditure in his "improvements" at Andalusia in the 1830s, and cost would seem a reliable indication of importance to the head of the nation's bank. As one of the most important parts of Biddle's work at Andalusia, and as the design of T. U. Walter, the graperies are of national landmark significance.

Beyond this, however, is the significance which the graperies have continued to hold. Far from simply disappearing at the end of their working life as greenhouses, the "adaptive use" of the graperies in the country seat's formal garden in the late nineteenth century continued to add significance, signaled by the garden's inclusion in Louise Shelton's *Beautiful Gardens in America*. Finally, the addition of the Mellor and Meigs work adds yet another factor of importance. As an ongoing focal point within the Andalusia landscape, the graperies should be considered no less a national landmark than the "big house," and treated accordingly.

APPENDIX A

NICHOLAS BIDDLE'S VINEYARD ACCOUNTS

Andalusia Day Book - 1829

1829

The first vines were planted as follows:

Thursday 23 - Friday 24 & Sat. 25 April

the Alexanders - 2500 cuttings from Mr Carr at Bartrams

also cuttings from Mr Girard - Dr. Hedins [?] & John Lerpant [?]

25 rooted plants from Mr Clapier

30 Do from Mr Carr

To these were added cuttings from the grapes in the garden at Andalusia

these being insufficient to fill the place,

We sent 300 to 400 about - more Alexanders from Mr Carr

which were planted on the 27th and 28th of April & one hundred Isabella grape

these being still not enough we planted 240 Alexander cuttings from Mrs. McMahons. 5 rows of 38 each. 1 part of a row 25 - and 25 more on the eastern border of the plantation - this was done on Friday the 1st of May.

The Alexanders were planted from the woods to the House

300 Alexander cuttings (also 240) from Mrs. McMahon at 2 cents =

Vineyard Expense Book 1829-1832

Col. Carr's calculations of the number of plants to an acre

6 feet by 6.	1210
6 5	1452
6 4	1815

Mr Bonsall arranges his cuttings in regard to their facility in taking root as follows: 1st Black Madeira - 2 Isabella - 3 Catawba - 4 Alexander - 5th Elsenborough

1829

Began to plant vines in the lawn of And^a

The first were planted Thursday 23, 24 & 25th of April 27-28th & then to the 1st of May

There were roots & cuttings

1 Roots - 24 from Mr Clapier & 30 from Col. Carr's garden viz:

Chapelas of Fontainebleau - 4. Muscatel 6. Hau[?]sterito 4. Black Orleans 6. Black Muscat 5 - White Chapelas 7.

2 The cuttings were 2900 Alexanders from Col. Carr -

Isabellas 100 & Alexanders 300

From Mr McMahon

Cuttings from Mr Girard - John Lerpant [?]

Also cuttings from Dr Hedings [?]. The Orwicksburgh 13 - Missouri (-sweet blue native).

To these were added cuttings from the Powel or Bland Grape in the garden at And^a

The whole number planted was 4292

The cost was. The roots from Col. Carr \$9. The cuttings \$57.50

Cuttings from McMahon -- 6.00 72.50

Planting them 9.50 - Board of planters - 3.27 - 12.87

Labor upon them ploughing & c. 40.23 53.12

Latt[h?]es for props 5.43

131.05

This proved an entire failure - The roots did not thrive the cuttings did not grow well - and in the course of the winter of 1829-30 so many were killed that in the plantation of 1831 we gathered together the remains & planted them together near the woods to fill up spots in the new plantation with the benefit of this hard experience I began in 1830

1830

Brot forward from 1829 _____

131.05

In March and April 1830 I planted the following cuttings in
the garden, procured from E. H. Bonsall

Catawba 400 at 2 cents - Black Madeira 2000 at 1 cent

Isabella 300 at 3 cents - Alexander 1500 at 1. cent 55.00

Elsenborough 100 at 3 cents -

I also procured cuttings from Mr Pratt & Mr Girard & roots from
Mr Clapier - The Piazza Vine of the Arbor in the Garden also
furnished cuttings

Labor for the grapes to D. Gando 11.87

Herring [?] to manure them 7.50

205.42

Stimulated by these ~~failures~~ I now resolved to go seriously
to work and not laying too much stress on cuttings to adopt
the system of planting rooted plants - Accordingly

In 1831

I planted in the Lawn:

March 31 & April 1 - 500 Catawba rooted plants from Mr Adlum 20 cts each	100
add expences of transportation	2.21
3750 rooted plants from A. Loubat at 9 cents	337.50
Expences & c	14.18
April 2. 325. Black Madeira from E. H. Bonsall at 6 cents	<u>19.50</u>
	473.39

I also planted in the garden.

March 15.	8000 cuttings from Mr. Maher at 1 cent	80.00
April 11.	1000 Catawbas at 2 cents from E.H. Bonsall	20.00
	251 Black Madeira 1.	2.50
	700 Isabella 3	21.00
	800 Alexander 1	8.00
	100 Elsenborough 3	3.00
	150 Isabellas	
	from Col. Carr	10.00
	350 Alexanders	
	transportation of all these to And ^a	<u>3.00</u> <u>67.50</u> . 620.89

The expences of
the whole were these.

11350 cuttings bought Roots -	4575 bought
<u>300</u> given about	300 from last year's cuttings
11650	

being all the result of the previous plantations of 1829 & 1830.

Expence of three pumps	150.93
Hogshead 1.50. Watering pots 2.12. Hose 68.70. Tin pipe 10.25	82.56
Manure	26.00
Laths	5.00
Work of various kinds-148.37. & 15.50 & 3.	<u>166.87</u>
	1052.25

	From 1829 - 131.05	
	1830 - 74.37	
1832. Brot forward	1831 - 1052.25	1257.67

Filled up the whole lawn with rooted plants.

March 16. A. Loubat's vines as follows: [Biddle did not fill in varieties here]

2600 vines - but as so many of those he sent last year failed he now sent 500 extra - making for only 2100 at 9	189.
---	------

Transportation 15.90. Porterage .75	16.65
-------------------------------------	-------

These with 1200 roots from the garden out of last

year's cuttings filled the lower lawn -	234.65
---	--------

Feb'y 1. S. Maher for 2900 cuttings planted in the garden -	29.00
---	-------

March 22 Manure	25.20
-----------------	-------

Lathes for props	3.25
------------------	------

Augt. 1 W. Wa[?] wire & nails	2.00
-------------------------------	------

Work. D. Gando up to	Feb'y. 12	\$21.50
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July 4.	69.50
---------	-------

A. Lipler	15.75
-----------	-------

July 30 A bill of \$29 of which for the vines - [?].	10.	25.75
--	-----	-------

117.75

1640.52

Nov. 16 1831 George Shull hauling Street dirt to the vineyard \$4.50

APPENDIX B

GRAPES GROWN AT ANDALUSIA

Nicholas Biddle's Grapes

Nicholas Biddle recorded the grapes he planted in his vineyard book and in his correspondence. Color in the name of the grape refers to the fruit.

1829

Alexander, dark fruit, Pennsylvania origin, hybrid or variety of *Vitis Labrusca*, possibly with *V. vinifera*.

Black Muscat, *vinifera* variety.

Black Orleans, unidentified, probably *vinifera* variety.

Chasselas of Fontainebleau, white fruit, *vinifera* variety.

Hau[n]sterito, unidentified.

Isabella, dark fruit, according to Downing, (p. 255)¹ originated in South Carolina, hybrid or variety of *Labrusca*, possibly with *vinifera*.

Missouri (Biddle notes this as "-sweet blue native"), probably *vulpina*, *Labrusca* hybrid.

Muscatel, white fruit, *vinifera* variety.

Orwicksburgh, unidentified, probably *Labrusca* hybrid or variety.

Powel or Bland Grape, red fruit, *Labrusca* hybrid or variety.

White Chasselas, *vinifera* variety.

1830

Black Madeira, *vinifera* variety.

Catawba, red fruit, *Labrusca* hybrid or variety.

Elsenborough, dark fruit, possibly *cordifolia* hybrid, according to Downing (p. 255).

¹A. J. Downing, *The Fruits and Fruit Trees of America* (New York and London: Wiley and Putnam, 1846). References to Downing in this Appendix are to this work, and page numbers accompany quotations.

1831

Auvergnat, dark fruit, *vinifera* variety. Downing identifies this as the "true Burgundy grape so highly valued for wine in France" (p. 236).

Black Hamburg, *vinifera* variety.

Meunier, unidentified, probably *vinifera* variety.

Muscadelle, unidentified, probably *vinifera* variety.

1832

Meillers, white fruit, *vinifera* variety.

Muscat Frontignan, red fruit, *vinifera* variety.

Red Foot (Pied Rouge), unidentified, probably red-fruited *vinifera* variety.

Robin Eyes (Oeil de Tour), unidentified, probably *vinifera* variety.

Sweet Guillant, unidentified, probably *vinifera* variety.

Craig Biddle's Grapes

1) Judge Craig Biddle included a list of grapes at Andalusia dated September 1, 1854; all were *vinifera* varieties. Those marked with an asterisk (*) are known to also have been grown by his father, and are listed above. They may have been the same plants or offspring.

Black Frankenthal. Downing (p. 237) identifies this as the same grape as Black Hamburg

Black Frontignac

Black Hamburg*

Black Morocco

Black St. Peters

Chasselas. There are several varieties of Chasselas. Since Judge Biddle listed this separately from the White Chasselas, this must have been a red- or golden-fruited variety: which is not known.

White Chasselas*

White Constantia

White Frontignac

White Malaga. Downing identifies this as the same grape as the following.

White Muscat of Alexandria. According to Downing (p. 243), this is "the most

delicious of all grapes, but requires to be grown under glass in this climate."

White Sweet Water

White Syrian

2) Judge Biddle also recorded the acquisition of plants of the following on May 22 1860. All were *vinifera* varieties, as in his earlier list, with the possible exception noted below.

1 Black Frankenthal

2 Black Frontignac

12 Black Hamburg

1 Black West's St. Peter's. Downing (p. 238) characterizes this as "one of the best sorts for a vinery without fire-heat."

1 Lashmore[?] Seedling. This unidentified grape is probably a variety or hybrid of a native species, since the appellation "seedling" was used exclusively for American grapes.

1 Muscat of Lurrel[?]

2 Royal Purple Chasselas

1 Sweet Water

1 White Nice

2 Wilmot Hamburg. Described by Downing (p. 237) as "a recent variety which is said to bear larger and handsomer fruit."

APPENDIX C

SUPPLIERS' BILL FOR THE GRAPERIES

General Note: All of the bills transcribed here are in the Box 24, Craig-Biddle Papers, the Historical Society of Pennsylvania, Philadelphia, unless otherwise noted. Included here are only those items marked or otherwise identified for the construction of the graperies. The bills typically also include items for the renovations to the mansion house, and often also work for Biddle done in Philadelphia.

1) Bricks

[According to T. U. Walter's breakdown, items for the Mansion in this bill total \$64.85, corresponding to a total for those marked with a check on the original bill, omitted here]

1835		To Jno. Snyder & Son			
May 8	To	6200	hard Bricks	6-3/4	41.85
"	"	8000	Light Stretchers	8 1/2	68.00
"	"	6000	Dark Stretchers	9 1/2	57.00
June 18	"	7500	Light Stretchers	8 1/2	63.75
19	"	7500	Dark Stretchers	9 1/2	71.25
"	"	150	hollow Tile	12 1/2 cts a piece	18.75
July 20	"	810	hollow Tile	" "	101.25
21	"	60	Large Flat Tile	" "	7.50
"	"	3000	Dark Stretchers	9 1/2	28.50
30	"	1000	Dark Stretchers	"	9.50
"	"	1000	hard Bricks	6 1/4	6.25
August 1 st	"	3250	Dark Stretchers	9 1/2	30.87
"	"	550	Large Flat Tile	12 1/2 cts a piece	68.75
28	"	16000	Dark Stretchers	9 1/2	152.00
Sept. 4	"	15400	hard Bricks	6	92.40

Ex^d Oct. 17. 1835

Tho. U. Walter Archt.

Mr. Biddle's Country Seat

[on verso]

Jos. I. Walter
Oct.17.1835

Phil^a October 22^d 1835 Rec^d of Nicholas Biddle Esq. Eight hundred & Eighty two 47/100
dollars in full being the amount of this Bill \$882.47
Jno. Snyder & Son

2) Metalwork

[Entries in this bill were marked by project, including the addition to the Mansion, the construction of the grotto and the summer house, and work done to Biddle's Philadelphia house.]

1835	Nicholas Biddle to Joseph M. & George Truman	
5 m 7	To 136 2/12 ft lead plate @ 14	19.6
	To 28 ft D @ 16	4.48
6 m 16	To 125 ft lead plate @ 14 for forcing houses	17.60
8 m 22	To 250 ft hanging gutter @ 16	40.00
	To 40 ft pipe @ 18 & 7 elbows @ 18 ea	8.46
	To 56 spout hooks @ 12 1/2 Ea	7.00
8 m 27	To 715 ft - roofing @ 14 over furnaces	100.10
	To 110 ft pipe @ 18 & 8 Elbows 18 Ea	21.24
	To 8 flanches & fixing 50 E.	4.00
	To 261 1/2 ft lead plate Double width & Covering Battlement on forcing house @ 28 p ft	73.22
9 m 15	To fare 5 m 7 \$1.25 & 6 m 19 \$1.	2.25
11 m 30	To 64 9/12 ft pipe @ 13 & 8 Elbows 13	9.45
	To 10 ft pipe @ 18	1.80
12 m 5	To 250 ft hanging gutter @ 16	40.00
	To 152 ft D @ 16 for 8 sheds	24.32
	To 8 flanches & fixing @ 50	4.00
	To 1066 93/100 ft roofing @ 14 on sheds	149.38
	To 261 1/2 ft Double width & fixing on fixing on Battlement @ 28 p ft	73.22

To 80 spout hooks @ 12 1/2 E.	10.00
To 8 Elbows to pipe @ 18 Ea & 16 D @ 13 Ea	3.46
To travelling Expences men & self	6.25
To tolls & hauling 2 loads	6.12
To fixing 2 lightning Rods	5.00

[in T.U. Walter's handwriting] Division of the Above bill
For Forcing houses \$630.31

Ex^d Jany 11. 1836
Tho. U. Walter Arch.
Mr. Biddle's country seat

Rec'd payment in full
Jan 30 1836
[signed] Jos M. & G. Truman

3) Cut Stone for Trim

[In T.U. Walter's breakdown of this bill is a total of \$451.70 "for Forcing houses." Although Struthers did not mark which items on the bill were used for the graperies, the costs for the last five items listed come to a total of \$451.71. Those above not marked for Biddle's city house, including objects clearly not used in the graperies, total \$230.42 1/2, 1/2 cent less than Walter's total of \$230.43 for "Mansion"]

Nicholas Biddle Esq. to John Struthers

1835	To 20 Blue marble platforms meas 264.4 ft @ 84/100	222.04 1/2
	" 16 White marble chimney copings meas 196 @ 84/100	164.64
	" 5 Blue marble sink stones meas @ 8.25 each	41.25
	" 2 Hydrant & 2 spoutstones (white) meas 20.4 @ 80/100	16.27 1/2

ex^d Jany 7. 1836
Tho. U. Walter Arch
Mr. Biddle's Country Seat

4) Furnaces

[Like the Struthers bill, the items are not marked by destination, but Walter's total for the Mansion corresponds to the bottom part of the bill, and the graperies' to the top portion]

Nicholas Biddle to Stephen P. Morris & Co.

1835

5 mo 7	For	2 cast frames with 2 door each & hold fasts	19.50
"	"	2 cast bearers for Bars 86# @ 4 1/2	3.87
		2 wrought bearers for for do. 22# @ 8	1.76
		2 dampers & frames 13 1/4# @ 25	3.31
		2 do. do. with regulating rod & thumb screws &c. 20 1/2# @ 25	5.13
		4 wrought bars to lay under bearers 17# @8	1.36
34.93			
5 mo 12	For	4 set like the above compt @ 17.46	69.84
" 19	"	2 " do. do. do. @ 17.46	34.92
" 25	"	4 set do. do. do. @ 17.46	69.84
6 mo 9	"	4 do. do. do. do. @ 17.46	69.84
" "		Patterns for the above castings	5.08
" "	"	2 set or 18 cast fire bars 155# @ 4 1/2	6.97
	"	14 set " 126 " " " 1083# @ 4 1/2	48.73

Examined Oct.31.1835

Tho.U. Walter Archt

Red payt 11th mo 3^d 1835

Stephen P. Morris & Co.

APPENDIX D

CRAIG BIDDLE'S GRAPE CULTIVATION REMARKS

1854

November 1. Put a barrel / 4 bushels of finely ground bones in each of the [illegible] borders, except the back one, right hand side, facing the woods, on which I put 160 lbs of [illegible - possibly a trade name]'s ammoniated phosphate of lime. This was all forked in and three cart loads of farm yard manure spread on each border.

1855

Febby 26th
commenced forcing the back range of graperies

July 12 - First grapes sent to market -

Nov. six loads barn yard manure & 8 bushels of bone dust, put on back ranges.

The result this year of my grape crop was more satisfactory. I have sold \$486.25 worth of grapes - my entire expenses were \$365.20 having a balance to my credit of 161.05.

1856

February 18th - commenced forcing the back Range of Graperies - Previous to which the entire front range was painted a lead color by Frederick. The winter has been one of unusual severity. The Delaware is perfectly solid even now. There is a foot or two of snow on the vine borders.

1857

February 20th Commenced forcing 1/2 of the back range using four fires. I found I could not command heat enough with the two. The winter has been more severe even than last. The border being first well manured with horse stable manure

1859

November 20th 1859 We commenced digging up the border of one half of the back range and taking up all the vines. I've dug to the bottom of the border, about 3 ft. in width from the wall, then filled in about 3 inches of shore gravel on top of that old sod & the dirt dug out mixed together. We found scarcely any fibrous roots and the main roots two to three feet from the surface.

After finishing the above we commenced on the other half of the back range & finished it in the same manner. The vines are put back & almost all the old wood buried.

N.D. (1860 or after)

Mr. Sherwood says he white washes all his vineries with following compositions which he finds more durable than ordinary wash and a good substitute for paint.

1/2 bushel of lime

20 pounds of tallow

You first slack the lime, with a small quantity of water. It will make about 36 gallons of water [liquid].

1863

Apr. 5th all pot vines and forced vines destroyed by fire -

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Figure 1

Fig. 3.

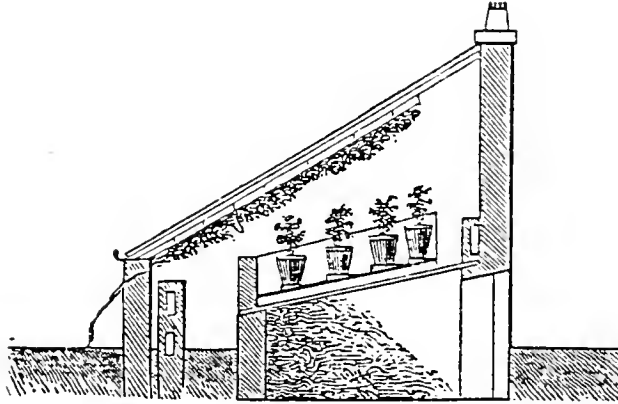


Fig. 3 is the section of a pit for winter forcing, which we consider well fitted for the several purposes to which these pits
4*

Figure 2

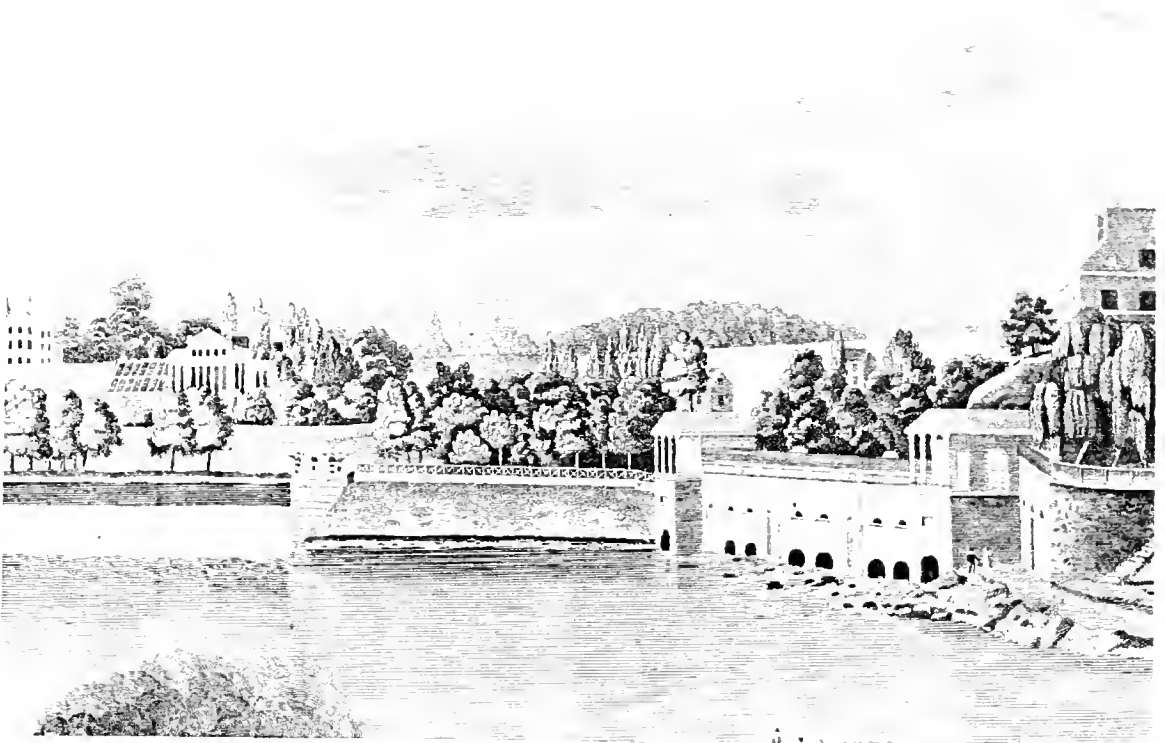


Figure 3



Figure 4



Figure 5



Figure 6



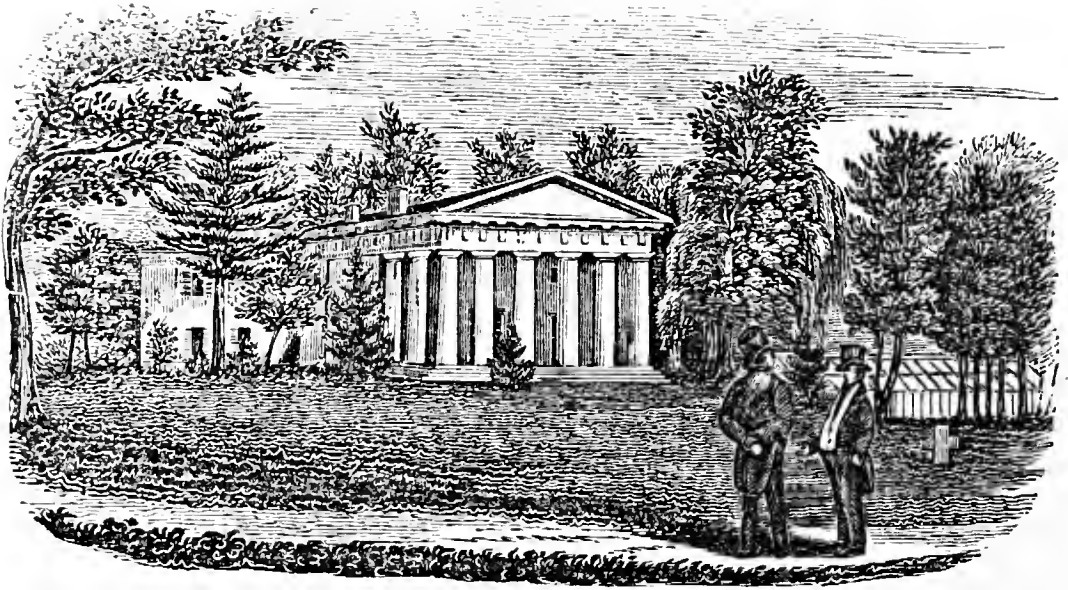
Figure 7



Figure 8

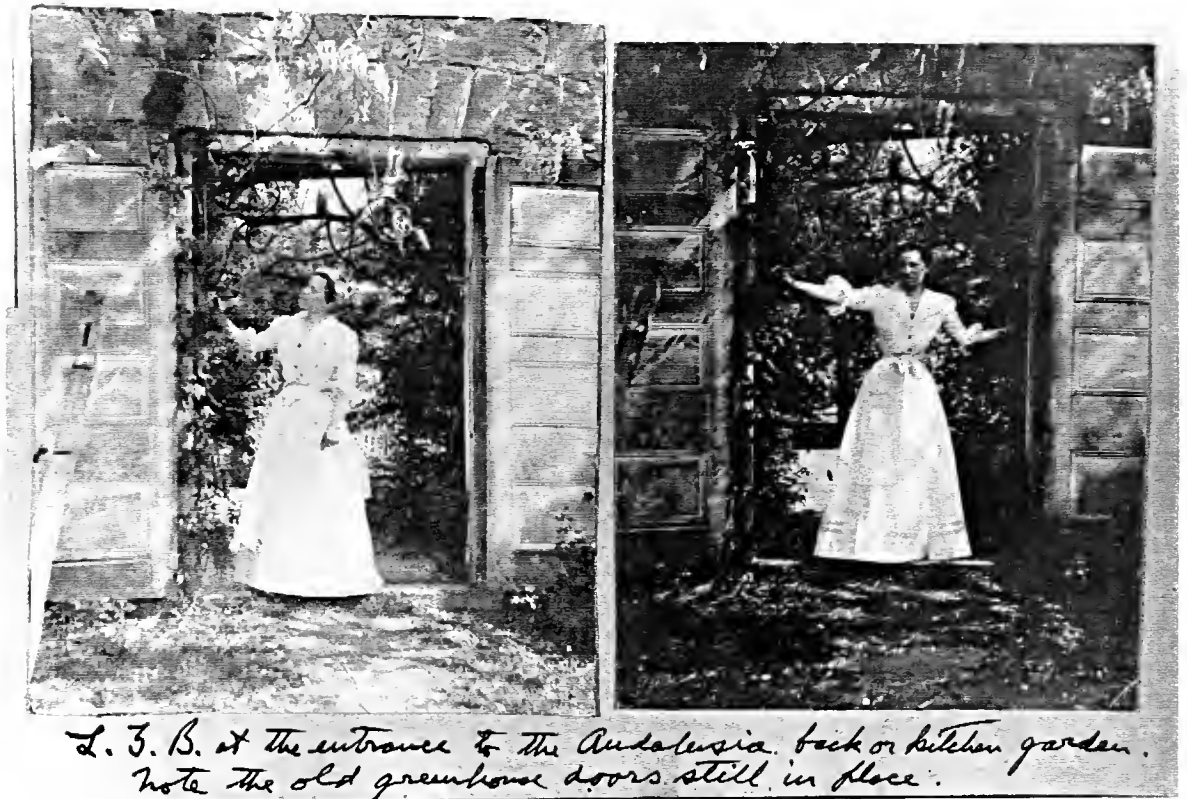


Figure 9



Country Seat of Nicholas Biddle, Esq.

Figure 10

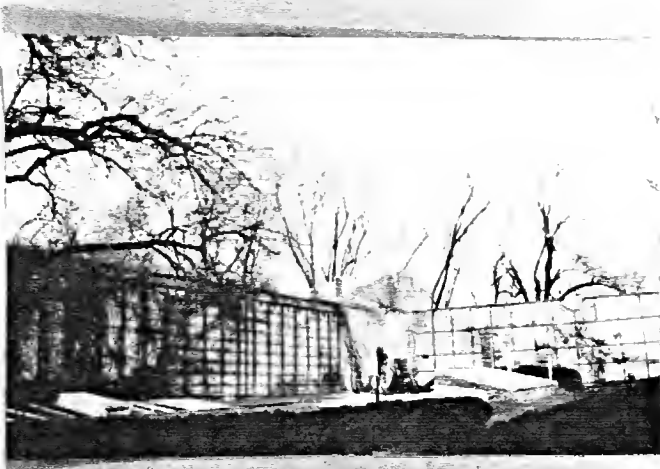


L. J. B. at the entrance to the Andalusia back or kitchen garden.
note the old greenhouse doors still in place.

Figure 11



Figure 12



North corner of Audalusia
garden taken in early spring
of 1915 after the Reservoir
house had been destroyed
by fire about Jan 1. 1915
and before it was rebuilt.
This is only picture showing
this that I know of.

Figure 13



J. E. & Gardner Thomas E. & wife

Figure 14

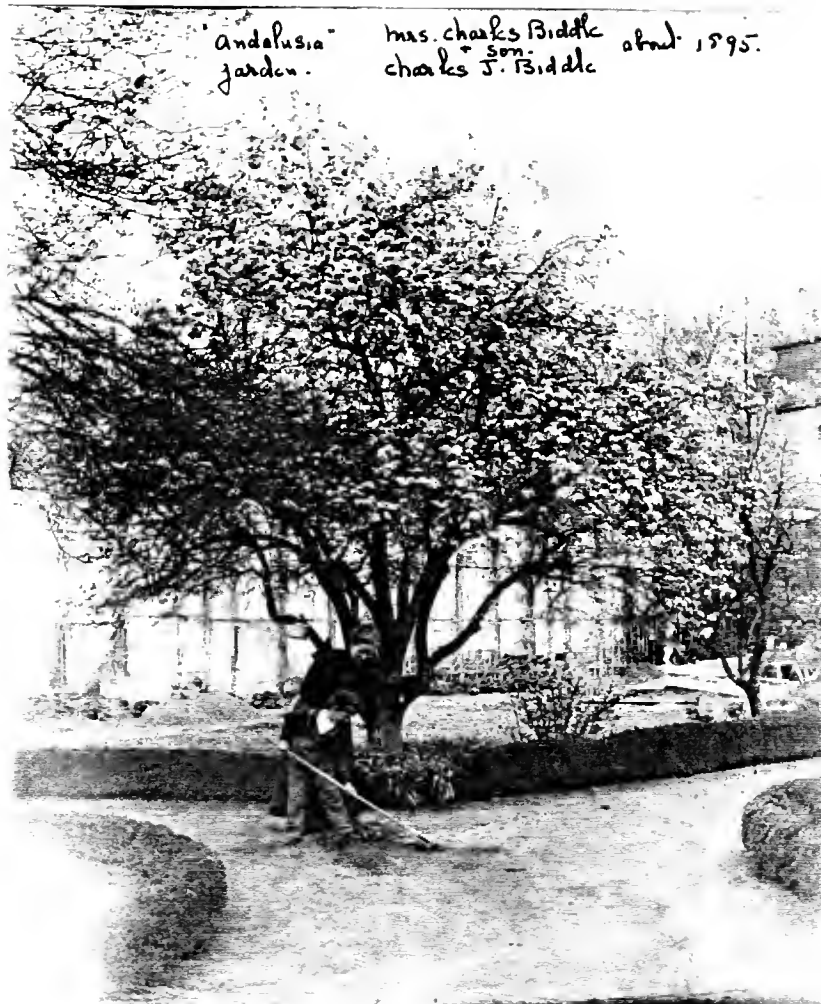


Figure 15



C. J. B. and LION. 1897

Note picket fence in front of garden
& big sycamore since replaced by a
tulip poplar.

Figure 16



Figure 17



Figure 18



Figure 19



Figure 20



Figure 21



Entrance to walled garden.

Figure 22

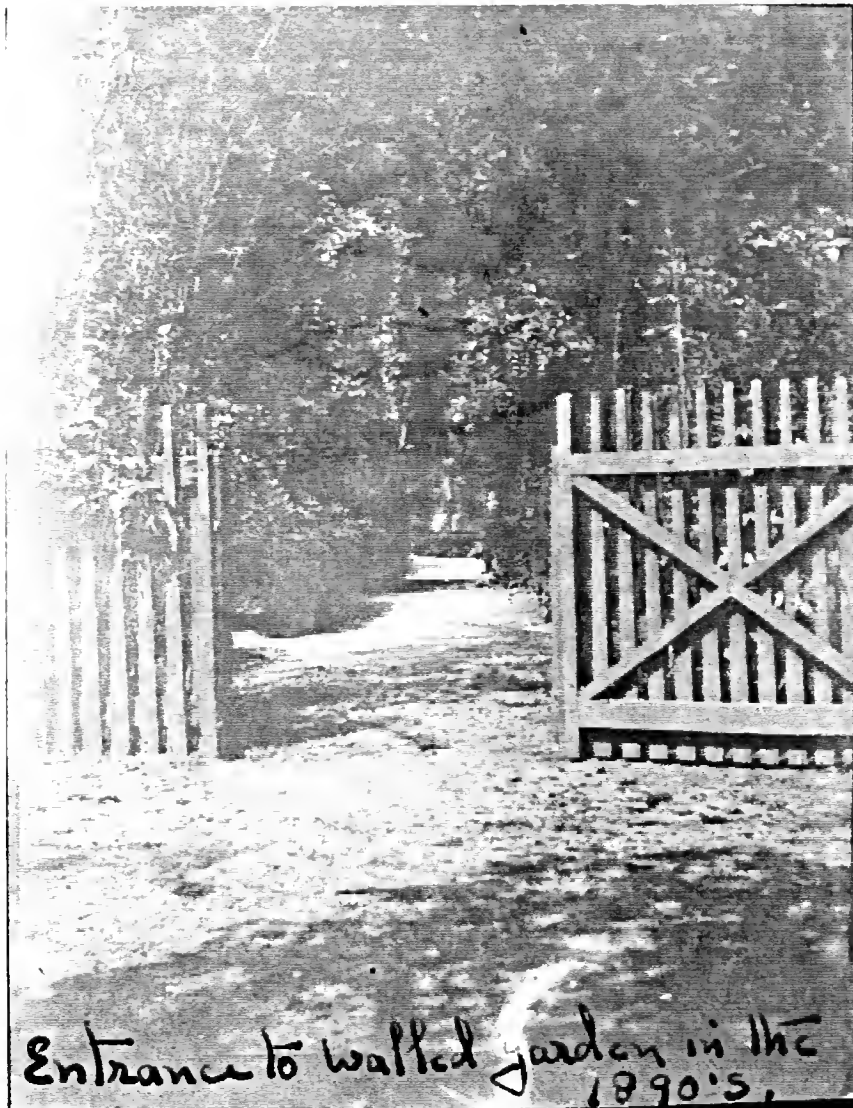


Figure 23

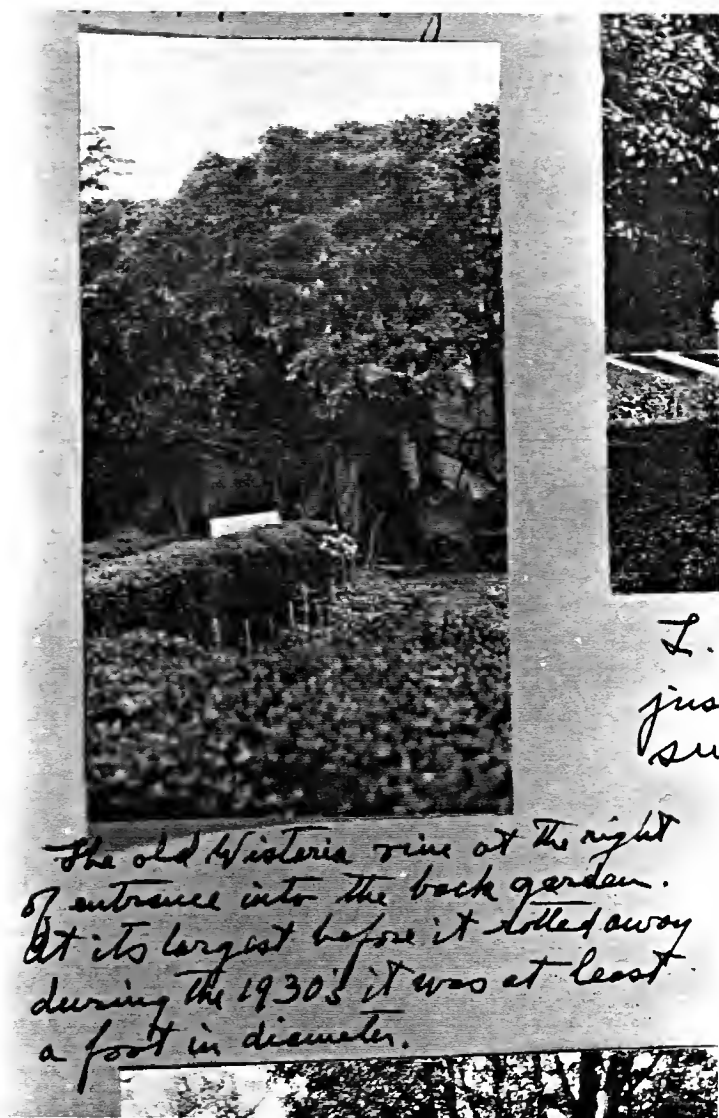


Figure 24



Figure 25



Figure 26



Anne & Jerome Fisher

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